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ARCHIVES OF PEDIATRICS

A MONTHLY DEVOTED TO THE

DISEASES OF INFANTS AND CHILDREN

JOHN FITCH LANDON, M.D., Editor

LEADING ARTICLES IN THIS NUMBER

Immunologic Implications of Ocular Complications Following the Acute Exanthematous Virus Diseases. Report of Four Cases.
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Cystic Fibrosis of the Pancreas. Report of Case, with Clinical and Pathological Observations.
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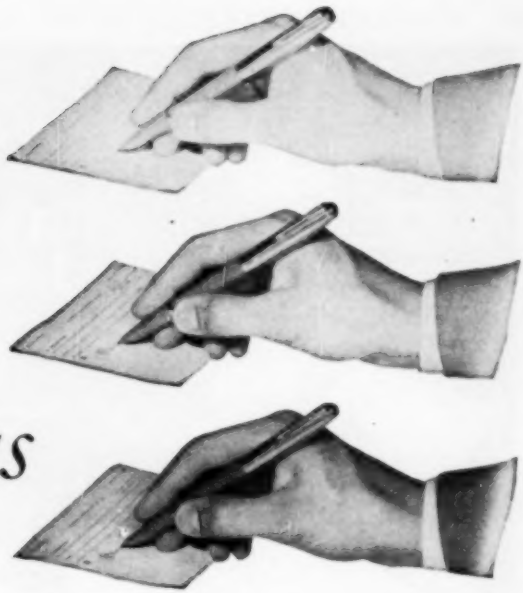

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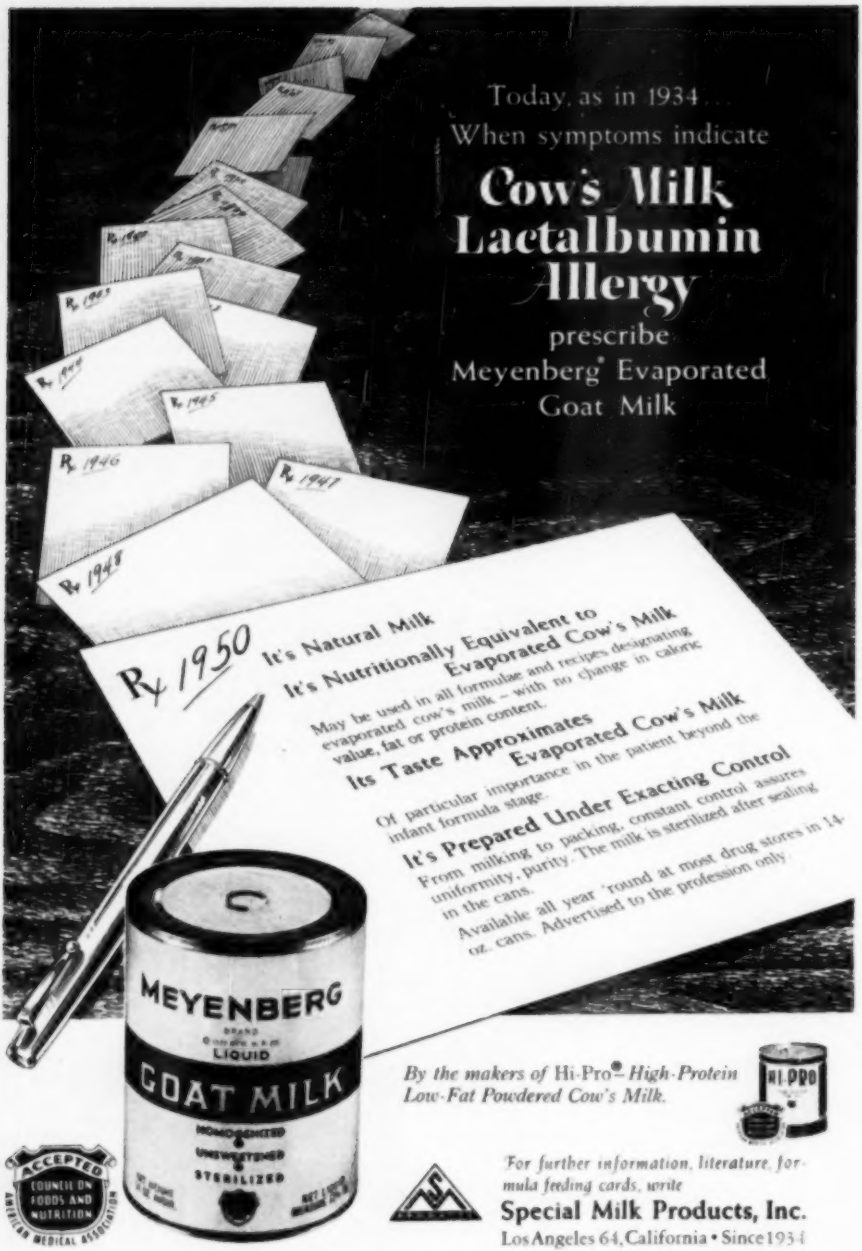
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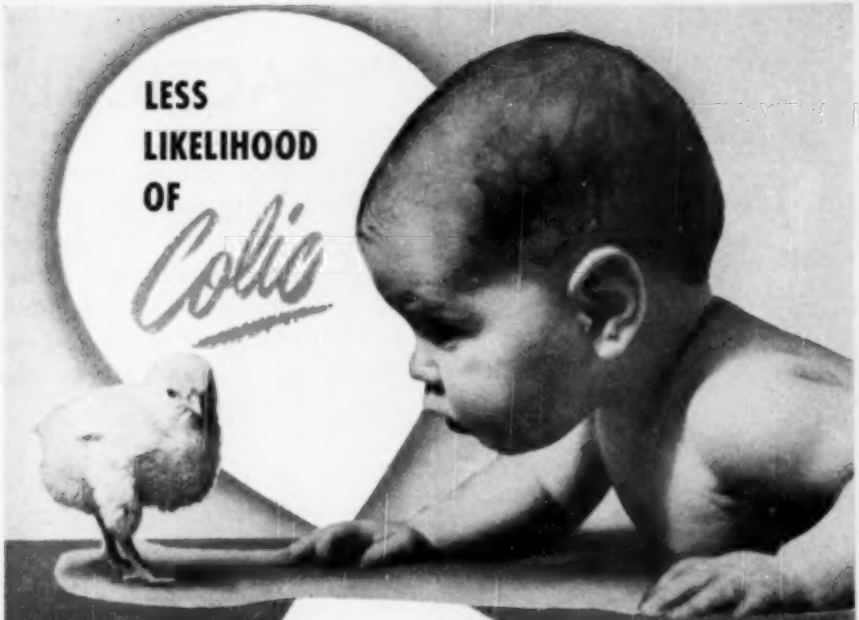

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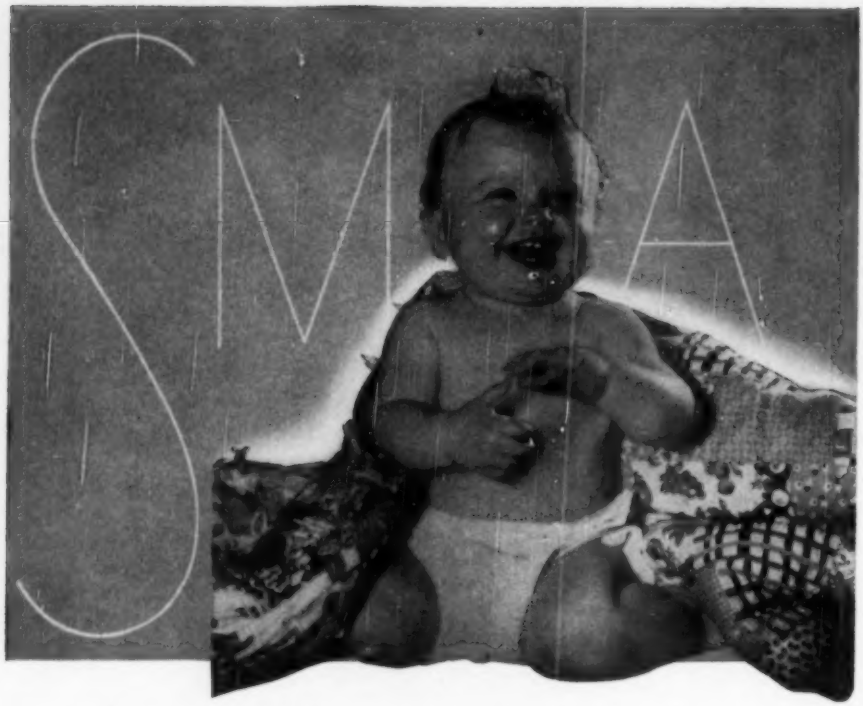

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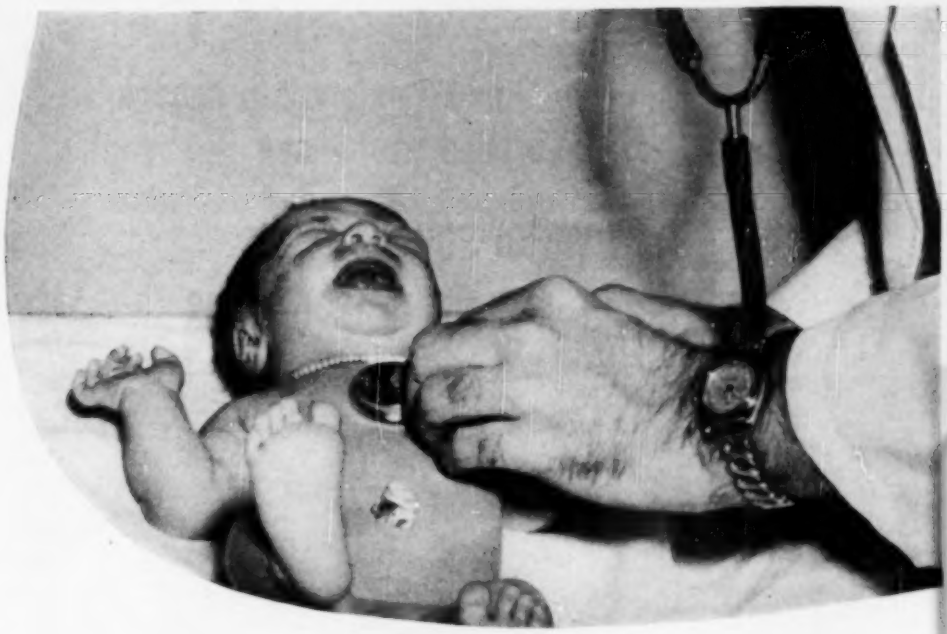

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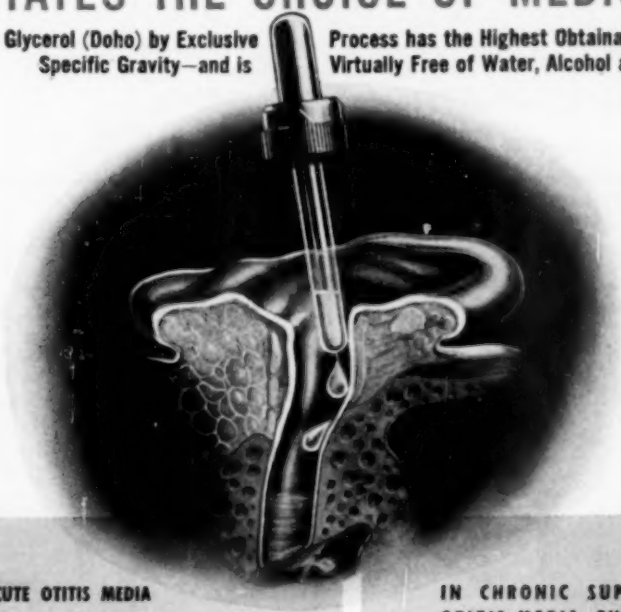

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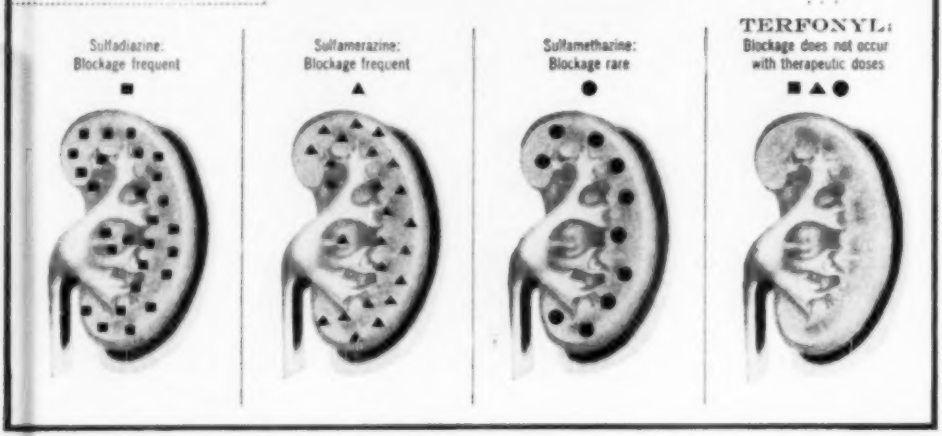

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IMMUNOLOGIC IMPLICATIONS OF OCULAR COMPLICATIONS FOLLOWING THE ACUTE EXANTHEMATOUS VIRUS DISEASES

REPORT OF FOUR CASES

EMANUEL ROSEN, M.D.

Newark, N. J.

In previous communications I have attempted to show a relationship between certain eye complications and vaccination[1]. Although for the most part these communications have been received with much skepticism, an occasional ray of accord has prompted me to report anew along an analogous line. Some years ago, Lowenstein[2] reasoned that since certain virus diseases of childhood are "near relations", they should be similar biologically. Having produced a specific lesion with the virus of herpes zoster in rabbits, he was constantly on the lookout for ocular complications following chickenpox. Eventually he studied and reported "a specific lesion of the cornea in chickenpox." In like manner I have been on the lookout for ocular complications following the acute exanthemata since the original observations upon vaccinial complications and, as anticipated, I have found them to be not infrequent. In order to show the apparent frequency of these symptoms it becomes necessary to emphasize some clinical generalities made years ago by L. J. Goldbach[3] who expressed the basis of these ideas although he was little cognizant of the nature and mechanism of the virus at that time. The following itemized highlights from his paper must be reiterated:

"1. Frequently systemic symptoms are so mild that one does not associate them with encephalitis.

"2. Unless one is keenly interested, it is easy to pass by insignificant symptoms and place no importance on them, especially in cases of mild attacks of encephalitis.

"3. Only when patients return years after one of these attacks and show evidence of muscle paresis, do we associate the two conditions.

"4. At times the patient has difficulty in recalling these attacks, for he has generally classified it as a mild case of "grippe" or a heavy cold.

"5. Temporary diplopia, anisocoria, disturbance of accommodation, oscillation of the eyeball and intermittent and alternating strabismus, when no other cause may be found on careful study, will suggest a former infection.

"6. In the mind of the laity the condition usually is not a mild case of "sleeping sickness" but an attack of "grippe."

"7. Evidence of these ocular manifestations of encephalitis must be considered in examination of the eyes for years to come."

These generalities suggest that the problem must be understood by the clinician as well as by the immunologist. It is important to bear in mind that immunity to a virus disease may be acquired by a subminimal infection—by an attack so light as to go unrecognized[4].

Francis[5] has stated that second attacks of the full blown exanthematous diseases do not occur so that immunity appears to be a permanent result of a primary attack. The portal of entry and the primary site of localization of the virus appear to be in the upper respiratory tract beyond which the virus progressively extends. With the onset of an acute illness, invasion of the blood stream takes place and, along with lesions of the mucous membranes, a secondary localization of the virus occurs in the skin producing the characteristic rash upon which clinical identification largely depends. After recovery, a rich supply of circulating antibodies is provided, and if virus were again to be introduced it might be able to establish itself superficially in the mucous membranes, but the stage of extension through the blood to produce the diagnostic eruption would be eliminated by the circulating antibodies which the virus would encounter. Under these conditions it is not unreasonable to believe that repeated upper respiratory infections with measles, smallpox or chickenpox viruses can

occur and that the presumed permanent immunity is, in fact, immunity only against the generalized disease. It is extremely interesting in terms of pathogenesis of the disease to observe the gradations from absence of disease to but slight modification of measles which can be attained by use of antibody after exposure to infection. Thus it may be seen that adults exposed to acute infectious diseases undergo a local antigen-antibody reaction in the upper respiratory tract, but the infection never becomes generalized. Yet certain areas may become involved at the height of antigen-antibody reaction even if this reaction remains local. These areas are usually regions of trauma (lowered resistence), previous infection or avascular areas.

It appears that when the initial battle occurs within the domain of the upper respiratory tract—the antigen-antibody fight never gets much beyond the nose and throat, possibly the lacrymal sac and conjunctiva—whereas when the antigen reaches pulmonic regions a secondary spread to and involvement of the brain may occur. (Noran et al.[6], Krieder[7], Kabot-Wolf[8], Fyfe and Fleming[9]). The following case reports exemplify the mechanism when restricted to the eye.

CASE REPORTS

Case 1. J.M., age 6, was first examined in 1947. She had just recently been given a pair of bifocals and had been informed that she had a paralysis of accommodation related to, or following, diphtheria contracted at some previous period.

A careful check into her childhood illnesses failed to reveal any illness which could possibly be misconstrued for diphtheria. There had been pneumonia at the age of two and bronchopneumonia at the age of five. Examination in July 1947 disclosed accommodation of right eye of 5 diopters and of left eye of 4.5 diopters, a mild heterochromia (right light brown, left dark brown) which the mother believed was present since age two. There was no other ocular anomaly. The bifocals were continued for close work. Thiamine chloride was prescribed in large doses experimentally as suggested by R. Sysi[10]. The patient seemed to improve, remaining comfortable for one year. In February 1948, the child was exposed to "mumps" which was present throughout her school. This was extremely mild and probably abortive. The symptoms in-

cluded a mild sore throat of "leathery" character, pain in the region of the parotid gland, a slight amount of nasal secretion, frontal headache, slight fever and a small crop of herpetic blebs upon the left cheek and nose. (These same symptoms appeared in many of the children at this private school). About four days after these symptoms, the child began to complain of difficulty in reading even with her bifocals. Upon examination one week later her accommodation was shown to be much lower, right eye 2.5 diopters, left eye 2.5 diopters. The conjunctivae were quite reddened—otherwise the eye examination was negative. In the next few days the child developed an acute sinusitis. In retrospect it would seem that the original lesion was probably viral involving the accomodative center in the brain. The involvement of an isolated area such as this need not be restricted to diphtheria. A subsequent abortive form of mumps apparently activated this already disturbed accommodation center.

Case 2. R.B., a 3-year-old boy, was admitted to the hospital with a diagnosis of possible mastoid of the left ear in November 1947. For about one week prior to the admission, the patient had had tonsillitis followed by an acute otitis media, a swelling in back of the left ear and some enlarged glands just behind the left ear. The pediatrician believed that the child also had a blepharitis and a conjunctivitis which was associated with this apparent upper respiratory infection. The mother stated that there had been a running nose and a cough for about four days during which time the child had a fever of 102°F.

In the past history nothing of importance was elicited except that the patient had had a mild case of chickenpox in 1946 following exposure to his sister. He had been vaccinated without any ill effects, but had not been revaccinated. He had no illness with any of the injections given in early childhood. The patient had never had coldsores, or herpetic involvement of lips, nose or mouth. The patient remained at the hospital for four days. The note made by the attending pediatrician indicated that there was a cellulitis about the left ear associated with preauricular nodes, several bullae in the hair on the involved side and an inflammatory process of the left eye. The skin condition cleared up rapidly, there was no mastoid involvement and with return of temperature to normal the child was discharged. Several days later the child

was referred to an ophthalmologist who stated that there was present a traumatic corneal condition. He remained under bi-weekly observation for two months during which time drops were used and one injection was given. The mother has noted that since this episode the left eye appears to get red every time the patient has a "head cold."

The patient was first examined three-and-a-half months after the onset of this illness. The left eye showed a typical disciform keratitis located almost in the center of the cornea and being quite dense. There were several concentric whirls or folds as is characteristically seen in disciform keratitis. The right eye showed several small superficial scars near the limbus at 4 to 6 o'clock with some increased vascular infiltrates in this area. These were well healed and somewhat grayish in appearance. The eye examination, otherwise, was negative except for the presence of a moderate amount of hyperopia and hyperopic astigmatism.

Case 3. L.S., a 5-year-old female child, has been regarded as a very allergic child ever since the age of two. She had both chicken-pox and mumps in April and May 1947. She had been under the care of an allergist for the past year or eighteen months and has been receiving small amounts of ragweed (1/10 the usual amount) because she tolerated the injections very poorly.

In November 1947, the patient developed a sore throat, some nasal obstruction and temperature of 101°F. There was also a mild stiffness of the neck. Because of these symptoms the patient was taken to her allergist who found that there was some degree of tonsillitis, an atopic dermatitis, but no involvement of the lungs. The patient was considered as being in an allergic phase, yet she was given .1 cc. of ragweed. Five days after this injection the patient's throat became quite sore and her temperature was recorded at 104°F. At this time the patient was examined by her family physician who stated that there was a follicular tonsillitis, a cervical adenitis and massive lymphoidal and adenomatous nasal tissue. The physician also ascertained that two days before his examination the patient had been sneezing a good deal and during one of these sneezing bouts she struck her eye against the back of a chair. Shortly thereafter the right upper lid became discolored, bluish-red and painful. The child was unable to sleep at night. For this condition sulfathiazole and metycaine ointment was prescribed.

The eye became more painful and red the next day at which time she was referred for ophthalmologic consultation. Upon examination the right upper lid was seen to be almost completely closed, discolored and edematous. The outer two-thirds of this lid was red in color and the lesion seemed to consist primarily of a series of small herpetic blebs which were filled with blood. Examination of the corneae was difficult, but a herpetic lesion was made out in the temporal third of the cornea of typical dendritic structure consisting of six dendrites each with a "clubbed" head. Upon examination forty-eight hours later, several new lesions of the skin were visible, whereas the dendritic process seemed more extensive and the cornea appeared somewhat thickened. The eye was kept covered for one week during which time atropine, bland ointments and vasodilators were used. At the end of that period the blebs of the skin of the lid had disappeared and it was possible to examine the cornea with the biomicroscope. The cornea showed a marked increase in its thickness and in one section a bulging of Descemet's membrane posteriorly could be made out with the narrow beam. The lesion continued to heal rapidly. At the end of three weeks there was no longer any photophobia and the corneal opacification seemed to be much less pronounced. At the end of three months there was very little residuum.

The highlights in this case of course include a definitely allergic child sensitive to viral disease, in whom an antigen given during a phase of illness produced a herpetic-like lesion of both lid and cornea with a definite traumatic superimposition. The possibility of an upper respiratory infection characterized by adenoid and lymphoid disturbance being the site of the original infection, and injection, trauma and naso-rhino lacrymal direct contiguity playing a role, cannot be overlooked. It might also be noted that some ointments, especially those containing the benzol ring, are capable of further traumatizing corneal epithelium at the height of immunologic activity.

Case 4. S.L., a 4-year-old female child, had no illnesses, fevers, allergies or other anomalies in her past history. There had been no previous significant systemic infection. About five weeks earlier the patient's sister developed measles and as a prophylactic procedure the child was given what the mother describes as a double dose of "immune globulin." She remained quite well, no compli-

cations being noted. No rash appeared. Seven days after the inoculation the child had a mild bout of sneezing, a running nose and some hoarseness. These symptoms lasted one day. About the same time the child developed redness of the right eye which the mother attributed to sand thrown into the child's eye while she was playing with some other children. The eye remained red for one week and did not seem to improve with penicillin, sulfathiazole, boric acid or other remedies suggested by the pediatrician. The eyes were examined about one week after the onset of the redness, at which time there was some subsidence of the acute symptoms. Only the right eye was involved. There was a prominent conjunctival injection on the nasal side only of this eye. Just within the limbal arc of vessels there were five or six limbal infiltrates already flattened out but still slightly active. These were just beyond the clear of the limbal arcade measuring 1 mm. in diameter. They were spindle shaped in cross section and just anterior to Bowman's membrane. Under conservative therapy the infiltrates cleared rapidly and completely in ten days.

From this diversified group of cases it would seem apparent that the cornea is in reality an immunologic laboratory wherein the antigen-antibody battle ensues much as occurs in the nose and throat as described by Wesselhoeft[1]. The intensification of the corneal response to minimal trauma when there is generalized bodily activity (hypersensitization) can no longer be minimized. It would seem that such a response is not too uncommon in the abortive or local reactions to the virus of many of the acute infectious diseases. This of course opens up an entirely unexplored field in which an etiologic endeavor is made to explain so many poorly understood lesions of the cornea. Besides sounding a warning note to "calender immunologists" and "corneal carpenters" a feeble attempt has been made to "spot the light upon the corneal limbus"—an area of greater importance than any other portions of the eye.

REFERENCES

1. Rosen, E.: Ophthalmologica, 115: 321-332, 1948; Am. J. Ophth., 31: 1443-1453, 1948; Arch. Ophth., 41: 24-31, 1949; Brit. J. Ophth., 33: 358-368, 1942.
2. Lowenstein, A.: Brit. J. Ophth., 24: 391-398, 1940.
3. Goldbach, L. J.: Arch. Ophth., 2: 555-559, 1929.
4. Wesselhoeft: Oxford Medicine, 1941, 497, 499.
5. Francis, T. Jr.: Bact. Rev. 2: 147, 1947.
6. Noran, Baker and Larson: Arch. Neurol. & Psychiat., 58: 653, 1947.
7. Krieder: Measles Encephalitis with Venous Thrombosis, 1943.
8. Kabot-Wolf: J. Exper. Med., 85: 117, 1947.
9. Fyfe and Fleming: Brit. M. J., 2: 67, 1943.
10. Sysi, R.: Acta ophth., Supp. XXV, Copenhagen, 1946.

CYSTIC FIBROSIS OF THE PANCREAS*

Report of Case, with Clinical and Pathological Observations

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Histopathologic studies of the pulmonary manifestations of cystic fibrosis of the pancreas commonly show in all involved sections a bronchitis and a peribronchitis. The bronchial lumens are usually filled with a purulent exudate and the alveoli show a patchy lobular pneumonia with scattered areas of air-bearing tissue. In many areas the epithelium of such bronchi is composed of more layers than usual, evidencing a squamous metaplasia of the superficial layers. The submucosa is diffusely infiltrated with numerous lymphocytes. The lining epithelium of the trachea is thickened and also commonly shows a metaplasia.

The squamous metaplasia of the lining epithelium of the bronchi replacing the ciliated columnar epithelium in the respiratory tract is comparable to the metaplasia in the pancreatic acini, especially in those distorted and containing concretions of various sizes.[1] Such similarity in histopathology has led to the postulate that the abnormal bronchial and pancreatic secretions are in themselves comparable and are a primary cause of the disease. Other common postulates attribute the pulmonary lesions to infection of unknown origin, to a congenital atalectasis, and, according to Andersen and Hodges[2], to nutritional disturbances and a deficiency of vitamin A resulting from an impaired pancreatic function.

The following report describes another instance of cystic fibrosis of the pancreas, gives the clinical and the post-mortem observations, and attempts to evaluate certain salient clinical and pathologic findings.

CASE REPORT

R. S., a male infant, aged 7 weeks, was first seen by one of us (L.R.) on November 12, 1947. The infant had been admitted to the hospital because of difficulty in breathing and because of an

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intractable diarrhea since birth. The mother had noted without alarm a slight and infrequent cough over the past week, but only during the past 48 hours had she observed the difficulty in breathing.

Pregnancy and Birth History. The mother, a primipara, Wassermann negative and Rh positive, had an uneventful full-term pregnancy. She delivered a 7 pound (3176 gm.) baby spontaneously and without complication.

Family History. The mother was 26 years of age and the father, a minister, 30, at the infant's birth. There was no past or present evidence of chronic illness and no present acute illness in either parent. Both maternal and paternal grandparents were alive and well.

Feeding History. The infant had been breast fed for 3 weeks, but because of a persistent diarrhea and a lack of gain in weight he was then given a formula of evaporated whole milk, water and dextri-maltose, the exact amounts of each could not be recalled. The stools continued to be loose or mushy, yellowish green, and numbered 5 to 6 daily. At about the fifth week of age and for one week he was given a formula of whole milk, water and dextri-maltose without improvement in the number or in the character of the stools. At the time of admission to the hospital the infant was receiving 20 ounces (592 cc.) of whole pasteurized milk, 10 ounces (296 cc.) of sterile water and 1 tablespoonful (15 cc.) of corn syrup (blue label Karo). Six ounces (177.6 cc.) was given at four-hour intervals. He had not received any supplementary vitamins.

Past History. Diarrhea existed since birth, the stools numbering 4 to 7 daily. They were yellowish green, either loose or mushy, and became foul smelling after the infant had been given artificial feedings. Except for an infrequent cough, noted one week before admission to the hospital, he had suffered no other illness.

Physical Examination. The infant was well-formed but poorly nourished and dehydrated and showed a perioral cyanosis. The circumference of the head was 37 cm., of the chest 34 cm., and of the abdomen 32 cm. The body length was 56.5 cm. The weight was 3746 gm. (8¼ pounds). The anterior fontanel was 2.75 by 2.5 cm. and was depressed. The pupils were equal and reacted

to light. The ear drums were normal. There was a pharyngitis. The tonsils were small. The chest was well-formed, but the ribs were prominent. The breathing was regular but effortful. The respiratory rate was 50. There was a moderate sternal retraction on inspiration. There were numerous coarse and fine râles over the anterior and posterior parts of the chest. The liver was palpable for 2.5 cm. below the costal margin. The spleen was not felt. The abdomen was scaphoid. There were no abdominal masses and there was no evidence of tenderness. The superficial lymph nodes were not palpable. The deep reflexes and the superficial abdominal and cremasteric reflexes were elicited. The skin was dry and the panniculus was thin.

A clinical diagnosis of cystic fibrosis of the pancreas was made because of the intractable diarrhea, at times loose and at times celioid in character, dating since birth, and because of the respiratory infection.

Course in the Hospital. The infant was given fresh protein milk 5 ounces (148 cc.) every 3 hours. He was also given orally 20 grains (0.13 gm.) of pancreatin 3 times daily, 20 drops daily of a cod liver oil concentrate, each drop or ½ minim (0.03 cc.) containing not less than 1560 U.S.P. units of vitamin A and 156 U.S.P. units of vitamin D, and an intramuscular injection of 100,000 units of vitamin A* weekly. At 4-hour intervals day and night he received intramuscular injections of penicillin and he was placed in a "Penisol" tent in which he received in ½ hour at 3 hourly intervals, day and night, 50,000 units of penicillin by inhalation. A transfusion of whole citrated blood, 20 cc. per kilogram of weight, was given immediately. The penicillin was given empirically.

From November 12 to November 17, the celioid state did not respond well to the diet and to the supplemental therapy. The stools continued to number 4 to 5 daily and were bulky, mushy, grayish-green and foul smelling. Irregularly a formed stool occurred. The appetite continued to be good. The chest, however, showed a diminution in the number and in the intensity of the râles and there was less sternal retraction. After a second transfusion within 24 hours, the infant appeared better hydrated.

On November 18 a moderate edema of the entire body appeared.

*The distilled natural esters of vitamin A in sesame oil were used, each ½ cc. ampule containing 50,000 U.

This became worse over the next 24 hours and, despite daily intravenous injections of 2.2 cc. per kilogram of weight of salt poor albumin (human), a marked ascites occurred on November 22. The body weight increased 1 kilogram to 4849 gm. The chest râles became more marked and the infant became dyspneic. He was then given intramuscularly 0.5 cc. of mercuhydrin sodium, each cc. of which contained 39 mg. of mercury as the organic molecule methoxyximercuripropylsuccinylurea (meralluride) and 48 mg. of theophylline. Marked diuresis followed with a trigger-like loss of tissue edema and ascites. The body weight loss was 0.75 kg. The infant appeared dehydrated and marantic and was immediately given a transfusion of whole citrated blood, 20 cc. per kilogram of body weight.

From November 23 to November 27 the patient appeared free from cyanosis, the râles were again less numerous and the appetite was good. The stools, however, continued unchanged in number and character. From November 27 to November 30 he became clinically steadily worse, although visible edema and discernible ascites did not recur. His appetite diminished, his cough became more frequent and persistent, and the stools increased to 6 or 7 daily. On November 30 he developed Cheyne-Stokes respiration, a marked abdominal distention, and a subnormal temperature of 97° F., rectally. He died at 3 P.M., 18 days after his admission to the hospital.

Laboratory Data. The peripheral blood on admission showed 4,200,000 red blood cells and 31,000 white cells. The polymorphonuclear cells numbered 64 per cent and the lymphocytes 18 per cent; the eosinophils 5 per cent, the basophils 1 per cent and the metamyelocytes 12 per cent. There was 1 normoblast per hundred white cells. The color index was 1.98. The hemoglobin was 13 gm. or 83 per cent. Almost daily peripheral blood examinations showed little change in this pattern, except on November 22, when the red cells fell to 2,240,000, the white blood cells to 9,000 and the hemoglobin to 8.8 gm. or 53 per cent. Repeated urine examinations were negative for blood, albumin and casts. Tests for sugar, acetone and diacetic acid were uniformly negative. The urine was always yellow, clear and faintly acid.

On November 18 the urea nitrogen was 11.5 mg. per 100 cc., the uric acid 1.4 mg. per 100 cc., the blood chlorides 530 mg.

NaCl per 100 cc., the blood cholesterol 105 mg. per 100 cc. The blood sugar was 60 mg. per 100 cc. The total serum proteins were 4.08 gm. per cent. The serum albumin was 2.49 gm. per cent and the serum globulin 1.59 gm. per cent. The patient's blood was Group B, Rh positive.

After the administration of the salt poor albumin (human) the serum proteins rose to 6.95 per cent.

The mucopurulent pharyngeal secretion on culture showed a hemolytic staphylococcus aureus.

Examinations of the duodenal secretions for trypsin, diastase and lypase were not made. The vitamin A content of the blood was not determined.

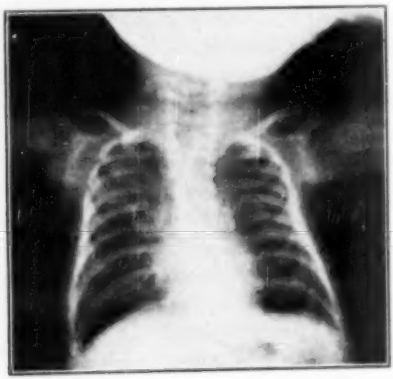

Fig. 1. Roentgenogram, anterior view, showing absence of any decreased irradiability.

Roentgenologic Picture. The roentgenograms, despite the clinical observations, were essentially negative. The generalized infiltration usually evidenced by a coarse mottling characteristic of bronchial pneumonia was not present (see Fig. 1).

Gross Examination at Autopsy. The body was that of a white male infant appearing to be about 2 months of age. The abdomen was considerably distended and, although there was a loss of body fat, the state of cachexia was not severe. There were no significant markings on the general body surface. The head was normally shaped. The fontanels were normal in size. There were

no abnormalities of the eyes, ears, nose or mouth. The extremities were grossly normal.

Primary Incision: A vertical midline incision was employed. There was very little subcutaneous fat present. When the abdominal cavity was opened, there was an escape of about 200 cc. of clear serous fluid. The viscera appeared to be in their respective normal anatomic locations. When the thorax was opened, the lungs were found to be large and voluminous and filled the

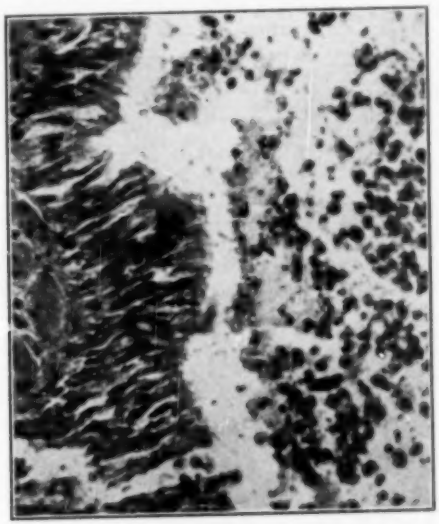

Fig. 2. High power photomicrograph of a small bronchus showing no evidence of the squamous metaplasia of the bronchial epithelium which is so often seen in cystic fibrosis of the pancreas. H & E x 450.

pleural cavity rather completely. There was no excess fluid in the chest. To facilitate the examination, a complete evisceration was accomplished. From the aortic arch downward the attachments were severed posteriorly in such a manner as to deliver the entire thoracic and abdominal viscera en mass.

Lungs: The weight of the right lung was 25 gm. and of the left 30 gm. Both lungs were rather voluminous in their appearance. Upon palpation, they had a light, feathery-like consist-

ency. The pleural surface throughout showed no evidence of pleuritic involvement. The lungs were rather pink throughout although at many points there were small mottled areas which were reddish in color. Grossly these areas suggested a pneumonic process. The cut surface presented a pinkish white lung tissue which was studded at many points by bronchioles containing a small amount of thick yellow pus. Scattered about in close proximity to these bronchioles were what appeared to be small miliary lung abscesses. However, the greater bulk of the tissue

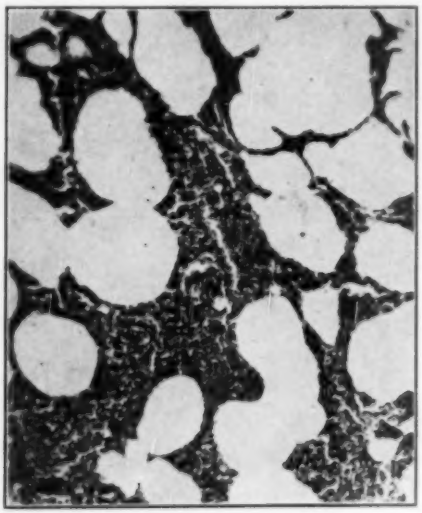

Fig. 3. Photomicrograph of lung showing emphysematous areas with adjacent areas of lung still in unexpanded fetal state. Note absence of exudate in alveolar spaces. H & E x 100.

was surprisingly free from any gross evidence of pathologic change. The voluminous character of the lung tissue suggested emphysema (see Figs. 2, 3 and 4).

Heart: The heart was normal in size and in shape and was normally situated. Examination of the great vessels revealed no gross abnormalities. When the heart was opened, the valves were found to be normal. There was a patent foramen ovale which

was well guarded by a septal flap. The arch of the aorta and the thoracic aorta were normal.

Liver: The liver was a dark reddish-brown in appearance. It had a smooth capsular surface. The cut surface presented no remarkable changes. The gall bladder was somewhat distended but otherwise was normal.

Gastro-intestinal Tract: The gastro-intestinal tract presented a moderate amount of intestinal edema and there was a moderate ascites. Otherwise, there was no pathologic involvement of the

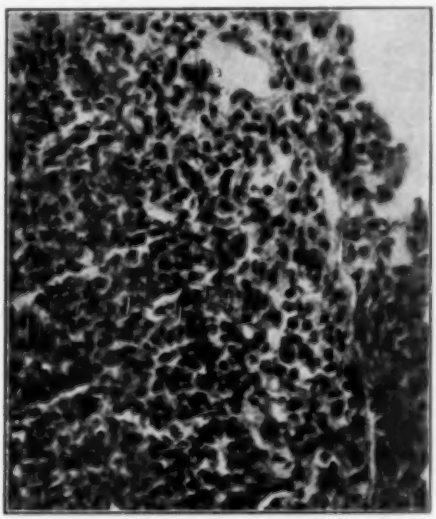

Fig. 4. High power photomicrograph of Fig. 3, showing unexpanded lung parenchyma. H & E x 450.

intestinal tract. The entire bowel was opened in an attempt to discover some areas of ulceration. However, the mucosa was clean throughout its entire extent. There was no increase in the size of the mesenteric lymph nodes and no increase in the intrinsic tissue of the bowel.

Pancreas: The pancreas was normally situated. The overlying peritoneal investment was rather edematous in character. When the pancreas was exposed, the surface appeared to be rather

intensely congested throughout. On palpation it was difficult to state whether there was any fibrosis. To the naked eye the cut surface appeared to be relatively normal (see Fig. 5).

Spleen: The spleen was normally situated. It was a dark dusky-red in color. On the cut surface were the usual markings of the malpighian bodies and septal structures.

Genito-urinary System: The kidneys presented a normal fetal lobulation. The ureters were entirely normal as was also the bladder. The testes had descended to the scrotum.

Adrenals: The adrenals were of normal size and appearance.

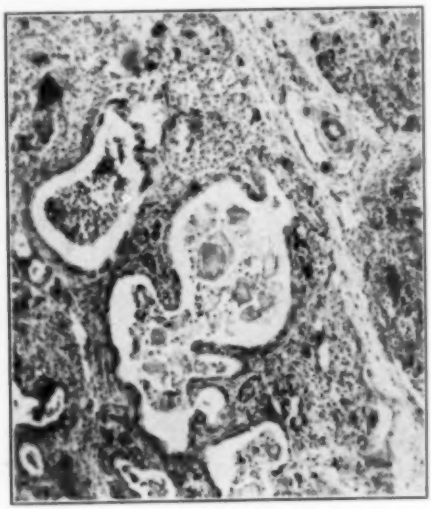

Fig. 5. Photomicrograph of pancreas, showing irregular areas of cystic dilatation. Note the broad zones of fibrosis with a variable lymphocytic infiltrate. H & E x 100.

Thymus: The thymus gland was of normal size and showed no gross pathology.

Anatomic Diagnoses: The diagnoses were cystic fibrosis of the pancreas, purulent bronchitis, focal bronchopneumonia, emphysema, atelectasis and fibrosis of the lung, cloudy swelling of the liver and acute passive congestion and myeloid metaplasia of the spleen.

DISCUSSION

Observations to be noted in this report are the occurrence of interstitial tissue edema and of ascites complicating cystic fibrosis of the pancreas and the absence of squamous metaplasia of the lining epithelium of otherwise characteristically affected bronchi. Anasarca and ascites in this disease have not been noted in the American literature, so far as we know.

The edema and ascites were at first postulated on the existence of a hypoproteinemia resulting from persistent diarrhea since the infant's birth. There had not at any time been any evidence of renal insufficiency indicating a lipid nephrosis or a nephritis. Nor, until the day of death, had there been any evidence of a failing heart. However, the administration of salt poor albumin (human) in sufficient amounts to raise the serum protein well above the critical level for edema did not cause a loss in interstitial tissue or in ascitic fluid. It was then felt that the whole blood sodium chloride of 530 mg. per 100 cc., despite a persistent diarrhea, was high for this infant and indicated that by some error of metabolism, renal or otherwise, sodium was not being sufficiently eliminated. Thus the higher colloidal osmotic pressure of the plasma resulting from the intravenous administration of albumin could not in itself hold water out of the tissues and the Donnan membrane equilibrium came into play. Unfortunately, sodium chloride determinations of the ascitic and tissue fluid were not made. However, the use of a mercurial diuretic appeared not to be contraindicated and its administration produced a prompt clinical effect so far as the edema and ascites were concerned. It is thus to be noted that a disturbance in sodium metabolism is a possible occurrence in cystic fibrosis of the pancreas.

The use of heroic doses of penicillin parenterally and by inhalation, and, perhaps the use of large administrations of vitamin A appear to have modified the usual histopathologic pattern of the bronchial epithelium of this disease in this instance. At least, the absence of squamous metaplasia of the lining epithelium in otherwise typically diseased bronchi is proof that a similarity in the histopathology of the bronchial epithelium and of the pancreatic acini is not the result of kindred disease producing effects in abnormal bronchial and pancreatic secretions at the onset of fibrocystic pancreatitis. Thus the evidence is that the lung changes

are secondary and are a result, most likely, of the nutritional disturbances and of a possible low blood content of vitamin A, as outlined by Andersen and Hodges.[2]

SUMMARY

A case is reported of cystic fibrosis of the pancreas clinically diagnosed and proved by post-mortem examination.

The possible occurrence in this disease of a disburbance in sodium metabolism, though rare, is emphasized, and the effect of therapy on the usual squamous metaplasia of the lining epithelium of the bronchi is postulated.

REFERENCES

1. Robbin, L. and Bernhard, W.: Cystic Fibrosis of the Pancreas. Report of a Case with Clinical and Pathologic Observations. Am. J. Dis. Child., 63: 530-540, March 1942.
2. Andersen, Dorothy H. and Hodges, R. A.: Coeliac Syndrome. Genetics of Cystic Fibrosis of Pancreas with Consideration of Etiology. Am. J. Dis. Child., 72: 62, Jan. 1946.

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PATHOGENESIS OF JAUNDICE. (Revista Clinica Espanola, Madrid, 32: 385, March 31, 1949). Jiménez Díaz and collaborators found that cholemia in normal persons consists of both the direct and indirect fractions of bilirubin. In 3 per cent of the cases studied by them normal cholemia consisted only of the direct fraction. Bilirubin is never encountered in normal urine, in the urine of patients with direct hypercholemia, in hemolytic acholuric jaundice, and in the urine of patients with nephritis. The indirect fraction of bilirubin is present in the urine of patients with choluric jaundice. Direct cholemia is high in patients with acute atrophy of the liver, regardless of the acuteness of parenchymal destruction. Acute hepatitis may proceed to fatal termination without jaundice. The authors found at necropsy on patients with acute atrophy of the liver with and without jaundice that jaundice was related to the presence of both edema of the liver and nodules of regeneration about the portal spaces. They conclude that the transformation of the indirect fraction of bilirubin into the direct fraction is performed by the kidney and not by the liver, as has been previously believed. The main causal factors of jaundice are edema of the liver and obstruction of the biliary capillaries from compression of nodules.—*Journal A.M.A.*

THE PEDIATRIST'S ROLE IN SEX EDUCATION*

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I am sure it will come as no news to many of us that there is a moral crisis existing today among our young boys and girls. Whereas in previous years society was concerned with the sex escapades of a more mature group, today the moral laxity has reached the early adolescent group. So much so that in many cities, parents, ministers and doctors are organizing to curb the shocking conditions.

Everywhere there is an increase in promiscuity, in teen-age pregnancies and abortions. Conditions in the high schools are appalling and this is true not only in the slum sections of the big cities, but in the finest suburban schools where there is supposedly more enlightenment and knowledge. "Sex experience among unmarried girls is probably twice as prevalent as 25 years ago," according to Dr. Luther Woodward[1] of the National Committee on Mental Hygiene. "The high schools and colleges are full of it. It's the No. 1 worry of parents of teen-agers all over the country."

I am sure that there must be many pediatrists who are concerned about these adolescents whom they have attended so carefully for so many years. From the time of birth we have watched these children for the slightest evidence of disease or abnormality. We checked them every month, watching for flat feet and knock knees, saw to it that they got their preventative inoculations, regulated every detail of their physical care, and even worried about persistent bed wetting; occasionally even sent them to a psychiatrist for it. Then they grow up into healthy adolescents, and suddenly all our work evaporates. Practically overnight, or so it seems, they start smoking and drinking at a very early age, and before they are mature enough to grasp the significance, they are involved in much sexual promiscuity.

A study of the sex histories of 4,600 draft applicants in 1941, whose ages were between 21 and 25, by Holman and Schaffner[2] revealed that 80 per cent of the single men had had sex experience.

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Of this number the ages given for first sex intercourse experience were as follows: By age 15 years, 21.2 per cent had had intercourse; by age 16 years, 36.0 per cent; by age 17 years, 51.0 per cent; by age 18 years, 63 per cent; by 19 years, 77 per cent; by 20 years, 86.2 per cent; by 21 years, 92.8 per cent—80 per cent single men between 21 and 25.

Significant also is the fact that more than half the men had had relations with nice girls, that is, girls of a society they would marry into. Kinsey[3] says one-quarter of all college and three-quarters of grade school male graduates had sex intercourse between 16 and 20 years of age.

Dr. Lewis Terman of Stanford University concludes that about two-thirds of our brides are non-virgins. According to Kinsey[4] this figure should be about 75 per cent, but half of these had sex intercourse only with the future husband. The figures for women at college having sex intercourse today is 35 per cent according to Kinsey[4] as against 7 per cent in 1929 by Davis,[5] and 26 per cent by Bromley[6] in 1939. This approaching single standard for men and women is already giving suspicions to many men whose male ego still demands virginity in the bride and chastity in the wife. Psychiatrists are beginning to see this factor in the mental disturbances of their patients, and the breakdown of the family.

From the foregoing figures by Holman and Schaffner, it is apparent that two-thirds of the boys had their first sex experience before graduation from high school and, according to the United States Children's Bureau, 50 per cent of the illegitimate births in the United States are to girls 15 to 19 years of age. Obviously, if sex instruction is to precede the first experience, it must be given before the fifteenth year. It is by then that the adolescent must know the spiritual and scientific facts about sex.

Who is giving them the sex information now?

Dr. Urban H. Fleege[7] of Washington queried 2,000 Catholic boys to see what sex education they received. Three-quarters of them had never received any from their parents. He saw most of these parents individually to find out why. Nearly all of them stated they didn't know how to start, and were embarrassed to use the coarse words (the only ones they knew) in discussing sex with their own children.

Landis and Landis[8] queried 2,000 college students about the

source of most of their sex information with the following results:

	Men	Women	Both
Mother	6.6	28.0	11.0
Father	5.5	0.0	4.0
Mother and father	9.0	4.0	8.0
Brother or sister	8.0	7.0	4.0
Other children	16.0	15.0	16.0
Doctor, minister	6.0	3.0	5.0
School class	10.0	11.0	11.0
Books, reading	31.0	27.0	30.0
Other sources	12.0	5.0	10.0

It is of interest that nearly all surveys show the most frequent source for first sex information is other children, yet in the group studied by Landis and Landis, a high per cent, 30, gave reading as a source. This study was made on college students as a source, one-third of them with parents who were college graduates.

Some of the student's comments were of interest. One said, "If I ever think less of my parents or my wife's parents for anything, it will be because of inadequate sex education." Another, "I knew nothing when I married and my marriage ended in divorce after four years." "My parents are still a little old-fashioned and figure it is not their duty to tell the children about sex." Students who had received sex information from their parents expressed their deep appreciation for it.

In a study of 291 middle class adolescent and pre-adolescent boys by Ramsey,[9] in a large American city in 1943, 95 per cent of the group was found to have gotten their first information from companions, and parents had had little to do with it. He personally interviewed all these boys. He found they all had had a considerable amount of sex knowledge before they were ten years old. By 14 years, nearly all had had a fair idea of the process of human reproduction. Over 95 per cent at the age of fourteen knew about the origin of babies, masturbation, intercourse and prostitution. Over 86 per cent at 14 years of age knew about contraception and one-half of the boys knew about venereal disease.

Ramsey comments that there was much misinformation and sordid interpretation. He states that many personality maladjustments, marital failures and delinquencies are directly traceable to parents' failure to give children proper sex education.

Terman[10] studied 777 husbands and 782 wives to see whether future marital happiness was related to sex education. He found husbands, whose chief source of sex information was other children, have lower happiness scores than those who received it from their parents or teacher. Those who got no sex education until 18 years of age had the lowest happiness score.

Twenty-five adolescent unmarried mothers in New York City were questioned about their sex information. Most of them had been taken in by their own ignorance. About one-half were extremely ignorant about sex, and the remainder had naive and false ideas about reproduction.

There is abundant evidence that more sex information is desired by the youth of today. The American Youth Commission questioned 13,400 Maryland youths and 75 per cent thought sex should be taught in schools. In a Los Angeles poll, 97 per cent of parents approved of sex education in the high schools, 95 per cent in the junior high schools and 75 per cent in the elementary schools. In 1945, Oregon passed a law requiring sex education to be taught in the schools, and produced the film "Human Growth," which has the approval of many educators, parental groups and child psychiatrists.

Pittsburg,[11] in 1940, started a sex course in schools in menstruation and marriage. By 1944 the number of pregnancies in high school was reduced by one-half. Tulsa,[12] Oklahoma, requires every high school student to complete a course in preparation for marriage and sex information individually.

In the schools reproduction and its functions should be taught truthfully, stating the facts, the differences in the formation of male and female body described, the action of the sperm in intercourse, and the way a baby is born.

The church is important as a source for ethical principles. It teaches the sacredness of marriage, the difference between the evil and the good use of sex power. As Monsignor Fulton Sheen[13] has said the difference between eating and gluttony, drinking and drunkenness, sex and lust or perversion of its use, must be understood. The relation of sex to love and marriage and children, and the spiritual aspects of life as a whole can be taught by the minister. In one church[14] 50 pamphlets on sex education are left on the reading table before the sermon. All are gone when the congre-

gation leaves, showing the interest of parents in the subject. The Catholic and Jewish ministers have always given sex instruction; now Protestant ministers are being trained to teach sex education.

Books and pamphlets may be valuable aids to parents, schools and churches in teaching sex facts to the child, but one must not forget that giving the facts of sex differences and reproduction are not enough. These are important to avoid misinformation and guilt feelings, as well as many complexes; also they avoid obscene associations with sex that the gutter usually associates with it. But it is most important for the adolescent to have a knowledge of the responsibilities of intersex activities, and of the emotions involved in the opposite sex from such activity. He must be taught to build a healthy, happy sex life in relation to future life and a happy marriage, not just as premarital indulgence for pleasure.[15] Adolescents have acquired sufficient knowledge of sex differences and the facts of child birth, but what is especially lacking today seems to be adequate information about such subjects as dating, petting, masturbation, continence, and the moral and spiritual aspects of sex relations. Two common misconceptions[16] among our youth are that continence is harmful to the male, and that absence of sex intercourse experience makes a girl frigid later in life.

Of course, the ideal person to impart sex information is the parent who is competent to discuss sex. He should get to the child before the street misinformation reaches him, and start with the very first question the young child asks. The parents' attitude in the home is important. The pediatrist can help by suggesting the proper attitudes to mothers when the child is brought to visit him. He can teach the parent to answer without apparent shock or shame the child's questions about sex from infancy on. These must be answered in simple terms which the child can understand, but not in details beyond his comprehension. It is as stupid to have an eleven-year-old child read Kinsey, as one of the parents I queried did, as to give a honeymoon or marriage course to a ten-year-old. If the parent speaks freely to his child, he will find that the child will come to him in the future with sex inquiries, and a splendid relationship will have been established as well as a fair assurance that misinformation acquired from other children will be corrected.[17]

Kanner[18] considers that the parent's requirements to be an efficient and sensible sex educator are familiarity with the facts, willingness to discuss them, truthfulness, overcoming of harmful prudishness, and the ability to give a dosage of sex education adapted to child's developmental and mental preparedness as evidenced by the typical questions, and good *common sense*. The commonest examples of wrong attitudes of parents are those who find sex questions shocking and disgusting. Some parents, who are themselves embarrassed and confused, are apt to treat sex furtively. Then there is the parent who feels that if he warns his child about social diseases and pregnancy that is all that is needed. There are others who use threats to discourage children's masturbation, and the result is guilt feelings and only adds to the child's insecurity. Some parents, especially those of boys, think sex indulgence should be for pleasure alone without respect to the personal adjustment of others or the social consequences. Others also have strange ideas about imparting sex information to their children. One mother thought it enough to tell her daughter to keep her virginity—"That is all you have to offer." A father stuck a book on sex information in front of his son and said, "Read this, and if you have any questions, let me know."

In order to determine what the parents of adolescent children under my care were doing about sex instructions of their children, and to find out whether they wanted me as the physician to play a role in that education, I sent out a questionnaire to 60 families where the children were between twelve and sixteen years of age. I sent a return addressed and stamped envelope, and wrote them that they need not give their name in answering the questionnaire if they did not choose to do so. In spite of this there were only twenty responses. This is only a small number, but I thought it worth analyzing their answers to determine whether there was a need or desire for my intervening in the sex education of the children.

Of the twenty, in 11, one or both parents had graduated from college, 8 high school and 2 grade school. The parental relationship was described as amicable in all but 4, strained in 3 families, and not amicable in 1. Nine were Jewish, 6 Protestant, 3 Catholic and 2 atheists. Church attendance was regular in only 5, irregular in 8, no attendance at all in the rest.

The age at which first sex information was given was from three to six years in 8, ten to thirteen in 6, 2 had only begun at sixteen years, 5 parents had given no sex information, and two had only taught sex anatomy. Eight had given further instruction since thirteen years of age.

Books and pamphlets had been given the children by eight of the parents. One used magazine articles, and one showed the son part of Kinsey's book. "The Wonder of Life" was the most frequent book reported, 4 parents having used this. "Growing Up" was next with 2, the rest varied from "An encyclopedia," "The Stork Didn't Bring You," to "Mercer Boys" and "various historic books," whatever that means.

Asked about whether they thought their child had guilt feelings about sex play, 12 said no, 1 yes, and the rest answered they did not know.

Eight of the 20, asked whether it was difficult to handle discussing sex with their children, said yes, it is. Eleven said no, and one didn't answer. The most frequent reason given was that the child was reticent or parent felt shy about starting to discuss sex.

As to the quality of the sex education given the children by the parents, the following results were obtained from the queries: Only 10 of the 20 parents had discussed sex anatomy with their children, only 5 dating and 1 said very little about it. Petting was discussed by 5, 1 parent saying very little, heavy necking by 3, 1 just slightly. "Going the limit" was discussed by 4 parents and 1 just touched on it. The effects of promiscuity were discussed by 5 parents, 1 just touching on it, intercourse by 5 parents, with 1 just touching on it, contraceptives by 4 parents, 1 saying little, venereal disease by 6 parents, 2 just mentioning it, homosexuality was discussed by 4 parents, 1 just mentioning it, and the importance of maintaining chastity and continence was discussed by 4 parents.

Do you want help from the Church? Seven said yes, 6 no, and the rest left the answer blank.

Do you want additional help from the school? Eight said yes, three no.

Additional help from books was asked by five parents, and five said definitely no.

From the physician, 14 wanted help, 3 said no, and 3 left the

answer blank. Of the 14 who wanted help from the doctor, 10 wanted a private interview between doctor and child (two were against this). Five wanted the doctor to discuss the imparting of sex information with the parents (six said no to this), and eight wanted the doctor to talk to a group of children about sex. Some of these overlapped.

It is obvious that the majority of the parents who responded are not satisfied with the present status of sex instruction for their children, and ask for aid from the school and physician. It is only natural to turn to the pediatrician. He has the confidence of the child, he has associated with him for many years, and has the respect of the patient. His answers carry a certain authoritative weight and are less apt to be doubted than parental information, or information received from a spinster teacher, or a minister whose views on life children often consider unrealistic.

Along about the year 1929, that fateful year, whether related to the financial debacle or no, the pediatrician began to take an interest in the adolescent. Prior to that, the upper age limit of our patients was twelve or thirteen, and with onset of puberty the child was released from our care, and no one really took an interest in him from thirteen to eighteen. We even lacked physical data about such obvious details as blood pressure. Pediatrists took the lead in studying the adolescent and now we claim him as our very own, since, we receive them in our offices and accept a fee for treating them. However, our responsibility to the adolescent should not cease with the addition of a few items to our routine examination like the taking of blood pressure. We must also take the lead and see that he gets adequate preparation for his sex life. Besides teaching parents how to teach sex information to their child, we should give individual and group sex talks. Every good doctor must have a little of the preacher in him. Dr. C. G. Kerley used to be successful with his undernourished children—he gathered about twenty of them in an undernutrition class at his office every Saturday morning and talked to them for an hour. As a result of my questionnaire, I am beginning to do the same with my patients. To date, I have only given individual talks and had discussions with small groups of four adolescents. The patients are grateful for the help offered, and it is apparent that it is a useful service.

SUMMARY

A questionnaire was sent to sixty families with adolescent children under the author's care. An analysis of the responses, although only twenty in number, show a dissatisfaction with the present sex education of the children. More than one-third found it difficult to approach their children on these subjects, usually because of their own reticence or in the child's shyness. The quality of sex education given by the parents was inadequate. Only ten had discussed sex anatomy, two had taught only this. Five parents had given no sex information at all, two had begun only when the child was sixteen years old. Sex promiscuity was discussed by only one-quarter of the parents, the same number who discussed petting. Books and pamphlets were used to help one-third of the parents. Further help in the sex education of the children was asked by about one-third of the parents from the church and school. Fourteen of the twenty families wanted additional help from the pediatrists, mostly by individual or group talks with the children.

Since two-thirds of our boys are experiencing sex intercourse before they are eighteen years old, and one-third before they are sixteen, and since there is an increasing promiscuity among adolescent girls, it is important that they have an adequate amount of sex information before fifteen or sixteen years of age. Up to the present, parents have been neglectful or unable to give the necessary information, schools and churches are making only feeble attempts, books and pamphlets and special movies are insufficient substitutes. The physician, and particularly the pediatrist, can play a vital role in helping the parent adopt the correct attitudes towards sex information from early infancy. Besides imparting the factual knowledge of the anatomy of the sexes, reproduction and birth, it is important to stress the responsibility of intersex activity, and to give wholesome attitudes towards its role in future marriage and life. The adolescent wishes to know more about behavior in dates, petting and intercourse.

BIBLIOGRAPHY

1. Woodward, Luther: Quoted by Howard Whitman in What Makes Girls Bad. This Week, 6, April 10, 1949.
2. Holman, Leslie B., and Schaffner, Bertram: The Sex Lives of Unmarried Men. Am. J. Sociology, May 1947.
3. Kinsey, A. C.; Pomeroy, W. B., and Martin, C. E.: Sexual Behavior in the Human Male, 1948.

4. Poponoe, Paul: Quoting Kinsey as having given these figures in public. Family Life, June 1949.
5. Davis, Katherine: Factors in the Sex Lives of 2,200 Women, pp. 104-106, 1929.
6. Bromley and Britten: Youth and Sex, p. 36, 1938.
7. Ernst, Morris L., and Loth, David: American Sex Behavior and the Kinsey Report, p. 49, 1949.
8. Landis, Judson T. and Landis, Mary G.: The Marriage Handbook, p. 470, 1948.
9. Ramsey, Glenn V.: The Sex Information of Younger Boys. J. Orthopsychiat., 18: 347-350, April 1942.
10. Terman, A.: Psychological Factors in Marital Happiness, pp. 27-29, 32, 33, 1938.
11. Ernst, M., and Loth, David: American Sex Behavior and the Kinsey Report, p. 13, 1949.
12. Ibid., p. 58.
13. Sheen, Fulton J.: Sex and Love of God. Collier's, 123: 11, Jan. 29, 1949.
14. Link, James: Speech before May 1949 meeting of New York Film Council.
15. Poponoe, Paul: Building Sex Into Your Life. Am. Inst. Family Relations, Pamphlet 1944.
16. Exner, M. J.: The Sexual Side of Marriage, 1939.
17. Riedl, Fritz: The Technique of Sex Information, Child Study Assoc.
18. Kanner, L.: Child Psychiatry, pp. 77-79, 1935.

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MARBLE STATE OF THALAMUS FOLLOWING BIRTH INJURY. (Brain, London, *72*: 83, March 1949). Norman reports a case in which "marble state" of the thalamus was present in conjunction with other lesions the result of vascular damage occurring at birth. The patient was a male idiot with cerebral diplegia who died at the age of 5 years and 3 months. The infant was born prematurely and weighed 5 pounds (2,495 Gm.). There was a history of severe asphyxia at the time of birth and twitchings of the hands and face observed on the fifth day of life. He appeared to be blind and had pale optic disks. Although a slight improvement was noted in the infant's physical progress, he was never able to stand or sit up because of a symmetric spastic paresis which affected the legs more than the arms. There were occasional seizures of a tonic type. Examination of the brain revealed a bilateral "état marbré" (marble state) of the thalamus and conspicuous areas of softening in each centrum semiovale adjacent to the lateral ventricles. The pyramidal tracts at medullary level were of the size and degree of myelination approximately appropriate for a newborn infant. The optic radiations and the external geniculate bodies showed partial destruction and there was an apparent increase in the neuroglial fibrils of the optic nerves and optic papilla. It was concluded that the lesions of the thalami and central white matter, which lay within the drainage area of the great vein of Galen, were late neuropathologic sequelae of birth injury. —*Journal A.M.A.*

EPIDEMIC APOPLEXY AND POLIOMYELITIS

A Contribution to the History of Infantile Paralysis

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It has been repeatedly stated that poliomyelitis appeared in epidemics only 50 or 60 years ago. This supposition requires careful appraisal of facts.

Snyder[1] (1925) made the following significant statement which appears to be applicable to the disease now designated as infantile paralysis or poliomyelitis: "The rule governing the history of a disease is that it exists some years among a people before it is known to that people by any particular name and that the disease exists many years before appearing in the literature of that people." In an editorial in the Edinburgh Medical and Surgical Journal[2] (1808) the following statement is made: "Epidemics will have different names at different times." Cooke[3] made the following pertinent remark in 1824: "It was the opinion of a late eminent physician that more real service may be rendered to medicine by the illustration of what is already known on the subject, than by any attempts to promulgate new theories or new modes of practice." It would appear that the disease now called poliomyelitis would be no exception to these rules.

Table 1. *Nomenclature of Poliomyelitis Prior to* 1890*

Acute anterior infantile paralysis	Infantile palsy
Acute anterior myelitis	Infantile paralysis
Acute anterior paralysis	Infantile paraplegia
Acute anterior poliomyelitis	Infantile spastic cerebral paralysis
Acute anterior spinal paralysis	Infantile spinal paralysis
Acute anterior tephromyelitis	Inflammation of the anterior columns of the spinal cord
Acute ascending paralysis	Inhibitory palsy
Acute atrophic anterior poliomyelitis	Medullary paralysis
Acute atrophic spinal paralysis	Morning paralysis
Acute cerebrospinal paralysis	Myelitis
Acute hydrocephalus	Myogenic paralysis
Acute infantile spinal paralysis	Nervous apoplexy
Acute inflammation of the anterior horns of the spinal cord	Nervous fever
Acute myelitis	Organic infantile paralysis
Acute myelitis of the anterior horns	Painful paralysis
Acute paralysis	Palsy
Acute polioencephalitis	Palsy of motion
Acute spinal infantile paralysis	Paralysis
Acute spinal paralysis	Paralysis of exhaustion
Anterospinal paralysis	Paralysis from foul bowels

Apoplexia hydrocephalica
Apoplexia infantum
Apoplexy
Ardent fever
Artophic fatty paralysis
Atrophic infantile paralysis
Atrophic paralysis
Atrophic paralysis of childhood
Atrophic spinal paralysis
Carus
Cephalitis
Cerebral infantile paralysis
Cerebrospinal paralysis
Chroea sancti viti
Chronic anterior poliomyelitis
Chronic atrophic spinal paralysis
Chronic meningitis
Chronic myelitis
Chronic rheumatism
Contagious fever
Duchenne's paralysis
Epidemic fever
Erb's juvenile progressive muscular atrophy
Essential infantile paralysis
Essential paralysis
Functional paralysis
Hemiplegia
Hydrocephalus
Idiopathic paralysis
Infantile cerebral paralysis
Paralysis of peripheral irritation
Paralysis from teething
Paralysis of children
Paralysis of early life
Paralysis of infants
Paralysis of motion
Phrenitis
Phrenitis aestivale
Poliomyelitis
Poliomyelitis chronica
Progressive ascending paralysis
Progressive atrophic paralysis
Reflex paralysis
Regressive paralysis
Resolutio nervorum
Rheumatic spinal paralysis
Spastic infantile paralysis
Spastic spinal paralysis
Spinal anterior paralysis
Spinal atrophic infantile paralysis
Spinal atrophy
Spinal infantile paralysis
Spinal paralysis
Spinal spastic paralysis
Spinal anterior general paralysis of Duchenne
Subacute posterior poliomyelitis anterior
Subacute spinal paralysis
Temporary paralysis
Transient paralysis

Prior to 1890—59 years ago—evidence indicates that poliomyelitis was designated by over 100 names reported from 24 different countries (Tables 1 and 2). The apparent increasing incidence of poliomyelitis and its apparent spread throughout the world, therefore, would seemingly arise from the fact that many diseases which formerly were designated by many different names in many countries are now classified essentially as only one disease.

TABLE 2. *Countries Reporting Poliomyelitis by Various Names Prior to* 1890.*

Austria	France	Netherlands
Australia	Germany	Norway
Brazil	Greece	Russia
Canada	Hungary	Scotland
Chile	India	Spain
Egypt	Ireland	Sweden
England	Italy	Switzerland
Finland	Mexico	United States

*Tables 1 and 2 were compiled for the most part from "A Bibliography of Infantile Paralysis, 1789-1944," prepared under the Direction of the National Foundation for Infantile Paralysis, Inc., 1946.

EPIDEMIC APOPLEXY

There is evidence that the disease now designated as poliomyelitis or infantile paralysis existed among the ancient Egyptians. Prosper Alpino[4] (1591) speaks about the use of the cautery by the Egyptians in apoplexy, palsy and epilepsy. Mitchell[5] (1900) described an Egyptian mummy apparently affected with anterior poliomyelitis. Hansen[6] (1912-13) found a description of a "stele" (a monumental stone plate) dating from the 15th Dynasty, about 2500 B.C. The principle figure is a man with a "withered" leg. The foot is in a typical equinus position, and there is shortening of the femur, tibia and fibula. Hamburger[7] (1911) also described a well-known Egyptian stele showing atrophic paralysis of the right leg.

Hippocrates[8] (460-370 B.C.) included paralysis under the general term "apoplexy". When he refers to paralysis, he employs the term apoplexy. He speaks, for example, of apoplexy of the leg. The ancient Greeks contemplated the two diseases as closely related to each other, or, in other words, as a species of the same genus. Cooke[3] (1824) states: "The ancients very generally considered apoplexy and palsy as diseases of the same nature, but different in degree, apoplexy being an universal palsy, and palsy a partial apoplexy". In considering apoplexy, Cooke says: "This disorder appears to have at all times engaged the attention of physicians, and we find definitions, or short descriptions of it, in the works of the earliest medical writers." Abercrombie[9] (1818) states: "By the ancients, much importance was attached to the spinal marrow as a seat of disease, especially in convulsive and paralytic affections." Areteus[10] (2nd to 3rd Century A.D.) says: "Apoplexy, paraplegia, paresis and paralysis are all of the same kind, and consist of defects of sensation, or of motion, or of all. Apoplexy is a palsy of the whole system, of mind, of sense, of motion." Alexander of Tralles[11] (525-605 A.D.), Aetius[12] (6th Century A.D.) and Paulus Aegineta[13] (630 A.D.) agree with the opinion of Areteus. Galen[14] (130-200 A.D.) states: "When all the nerves have lost sense and motion together, the disease is called apoplexy; when this happens to a part only, whether left or right, it is called palsy." Cooke[3] mentions that the sentiments of Areteus and Galen on this subject were adopted by all the Greek physi-

cians. Celsus[15] (25 B.C.-50 A.D.) describes palsy and apoplexy by the general term "resolutio nervosum". Good[16] (1826) points out that paresis is a slight or imperfect palsy. Serres[17] (18th Century) subdivided apoplexy into cerebral and meningitic.

Epidemics of apoplexy are apparently not mentioned by these early writers but probably existed since they are described by writers in the 16th and 17th centuries. Foresti[18] (1634), for example, states: "And we have ourselves seen in the year 1562, when the condition of the atmosphere (constitutio aerie) was humid and rainy, and the south wind had existed for a long time, very many persons to have perished by apoplexy." He then describes a number of cases under his care, mentions certain streets and villages as especially affected, and describes many of the attacks as mild apoplexy (levis apoplexia) from which recovery took place.

Baglivi[19] (1704) states: "For the last two years, the apoplexy has swept off great numbers of people both in this city and all over Italy, and the fatal effects of this disease were so frequent that they alarmed even the healthful with apprehensions of sudden death. The cause of this epidemic apoplexy is justly imputed to the unusual constitution of the weather in those years. The summer of 1693 was so extremely hot and scorching, which was followed by nipping cold weather, in the beginning of 1694, and, contrary to the custom of Italy, with rigid frost, snow and ice. The summer after that was much hotter than the former, insomuch that for five months together there was no rain. About the beginning of October it began to be wet weather, and continued such, with a southerly wind to April 1695, and that to such a degree that so much rains was not seen to fall at one time within the memory of man. After fifteen days of continued rains, perhaps we had two days of clear weather, which were followed by heavier rains than went before. After this uncustomary weather the above mentioned apoplexies displayed their rage; and perhaps some part of the epidemic disease was owing to the universal grief and domestic care, occasioned by such calamatous times; all Europe being at the time engaged in a sharp war, the like of which has scarce been heard of since the foundation of the universe was laid. So many cities were razed and burned; so many thousands of men slain; all commerce disturbed, and the avenues of peace

blocked up, that the strongest heart could not bear the thoughts of it."

Lancisi[20] (1705) saw apoplexy suddenly become so common in certain parts of Italy that he described it as having been in that year really epidemic.

Morgagni[21] (1682-1771), Italy, Formey[22] (1766-1823), Germany, and Stoll[23] (1742-1766), Austria, also noted the epidemic prevalence of apoplexy. Frank[24] (1745-1821), Germany, found apoplexy most prevalent at St. Petersburgh and Wilna during the height of the summer. The influence of hot weather in producing the disease was insisted on by Morgagni and by Cheyne[25] (1777-1836), Scotland.

An unusual amount of interest in apoplexy and paralysis was manifested in the British Isles during the 18th and 19th Centuries. John Hunter[26] (1728-1793), England, regarded apoplexy and palsy as one and the same disease merely differing in degree. Cheyne[25], Scotland, says: "Between the 12th of May and the 9th of August in the year 1808, I was called to nine cases of apoplexy", and he observes, "the summer of 1808 was the most sultry I have ever experienced." He adds: "As far as I know the only quality of the season upon which the disease depends is extreme warmth." The lameness of Sir Walter Scott (1771-1832) is attributed to infantile paralysis by several writers.[27, 28, 29]

Uwins[30] (1812) states: "On these affections, which are, in a somewhat vague and sweeping manner, termed nervous, there has been, within the last five years, an evident increase." He terms the disease "chroea sancti viti"! Uwins gives a case history as follows: "The first case, then, that came under my care was that of a youth about seventeen, the son of a painter in this town, who, with that drawing of one leg after him in walking, so characteristic of this complaint, complained likewise of vertiginous sensations and pains in his head, and had a remarkably wide pupil of the eye."

Sym[31] (1818) speaks about an epidemic of "nervous fevers" since the symptoms are referred to the brain and spinal marrow and he points out that the symptoms referred to the thorax and abdomen could not be explained by examinations of these organs. An editorial in the Edinburgh Medical and Surgical Journal[32] (1818) points out that there was an increase in this fever in

Ireland in the summer of 1810; in Scotland in 1815; and in England, not until 1816. It is stated: "In every part of the empire, 1817 has been much the worst year. Many of the cases which contribute to the production of fever are altogether out of control, such as unknown states of the atmosphere, inclemency of weather and deficiency of food." Government action was taken to investigate these epidemics.

In the same year, 1818, Edmonston[33] gives an account of fever which had lately prevailed in Newcastle-upon Tyne, and its neighborhood. This outbreak appeared during a drought and sultry weather and suggests the prevalence of what is now known as poliomyelitis. Edmonston points out that the disease put in a variety of appearances calculated to perplex. "The most strongly marked symptoms were vertigo and pain in the head, chiefly referred to the occiput, more particularly to the back of the neck; sometimes to the center of the brain, with a pulsing, rending sensation, as if the skull were ready to split. There was often nausea, retching and diarrhoea. In many the digestive powers were inactive and medicines were required for evacuations. The urine was clear and dark colored.

"Children and people in the vigor of life were chiefly affected. There were only a few families in which two or three members were affected by the disease; in these cases it was in a great measure simultaneous. With one or two exceptions, none of the immediate attendents of the sick took the fever.

"Suppressed perspiration, sudden and great alterations of temperature, fatigue, exertion under oppressive heat; in a word, excess or irregularity of some sort, could in most instances be clearly enough traced, or more confidently assigned by the patients themselves." Edmonston points out that many felt that the epidemic had no contagious properties.

Abercrombie[34-38], Scotland, wrote extensively on the subject of apoplexy and paralysis in a series of articles in 1818-1819, and in his book in 1828. He points out that not only did the ancients attach significance to the spinal marrow as the seat of disease, especially in convulsive and paralytic affections, but that a great deal was done in the investigation of this subject by continental writers, including Frank, Ludvig, Astruc, Ploquet, Portal, Brera and

Ranchetti. Abercrombie points out that many paralytic affections depend upon diseases of the spinal marrow.

Gourlay[39] (1819) describes an epidemic in a country parish in the north of Scotland under the name "epidemic fever". He states: "There are instances of it attacking only one in large families of young people, and there are often instances of young women sleeping with the sick (against my positive injunctions) during their illness and convalescence, and continuing in perfect health; and it may be noteworthy of observation, that during the month of October, when the disease was most common at Lentrathen, the immediately adjoining parishes were perfectly free from it". He points out that none of the patients had any cough but several had a slight degree of sore throat.

Hunter[40] (1819) describes the same disease under the term "continued fever". He says: "In no one symptom has the disease in Leeds differed from the many accurate histories detailed in the late numerous publications on the subject. Pain in the head and back, extending to the limbs, suffusion of the eyes, general oppression, nausea, and occasionally fixed, and I do use the term, spasmotic pain in the bowels, are the leading features."

Shaw[41] (1823), England, in his book describes partial paralysis and wasting of the limbs in children which frequently produces distortion of the spine. It appears to be significant that several contemporary writers of that period also wrote of the prevalence of spinal distortion. Shaw mentions the occurrence of paralysis among English children residing in India. He refers to a patient under his treatment who, during his childhood in India, had lost power over one leg in the course of a single night. His parents said he had been in good health at that time. "I have been told," Shaw says, "that such attacks are common among children in India and that strong and healthy children are more frequently affected than those of a weakly constitution."

Boehave's reference[42] (1761) to paralytic conditions in Asia acquires increased interest when compared with Shaw's mention of its occurrence in India and with Goodeve's much later reference[43] (1879) to frequent paralytic illnesses among English children in India. These facts appear to be of great significance in view of the great prevalence of manifestations of sunstroke in India to be mentioned later.

Cooke[3] (1824) in his book, "Treatise of Nervous Diseases", states: "The nervous diseases of the animal functions are particularly worthy of attention, for they frequently occur, and are highly dangerous. The most important of them are apoplexy, palsy and epilepsy." He says: "In the writings of modern nosologists we find a great variety of definitions of apoplexy."

Cooke subdivides apoplexy into a number of conditions, one of which is of outstanding interest, viz, apoplexia infantum. He points out that Stoll, as well as Portal, considered this form of apoplexy as symptomatic of worms or dentition. Portal says: "I have seen children of a plethoric constitution during dentition with a true coma ending in palsy of the arms or legs."

The term "apoplexia hydrocephalica" or "hydrocephalus internus" is used not only by Cooke to describe these cases, but also by many other contemporary writers. A writer signing his name J.H.W.[44] (1806) points out that hydrocephalus and worms are frequently confounded. He describes hydrocephalus as follows: "The disease is not confined to any particular age, but most frequently attacks children under 12 or 14 years of age. It begins sometimes suddenly without any previous warning, in the form of a common fever; or its progress is slow, like a chronic disease, and its attack is first announced by some affection of the head. In the first case it usually affects the healthiest, stoutest, and most lively children, rarely under two or three years of age. It does not confine itself to any particular constitution, although there have been instances of several children in the same family dying of it. An attentive observer will often suspect its approach several days previous to the attack, from a tottering or stumbling on even ground, and from a peculiar walk of the child where the limbs do not seem to be lambed, but refuse to perform their natural office, the child lifting them high, and taking long steps, without complaining of any uneasy sensation. These appearances are soon followed by the true morbid affection, such as the feverish state, intolerance to light, and pain in the head." Fothergill[45] (1712-1780) states, regarding the symptoms of acute hydrocephalus, that there are, "a pain in the small part or other below the head, most commonly about the nape of the neck and shoulders, often in the legs, sometimes, but more rarely, in the arms." "The head and stomach", he says, "are always more or less affected from the beginning." White[46] considered three stages in acute hydrocephalus:

1. Stage of increased sensibility, 2. Stage of decreased sensibility, and 3. The paralytic or convulsed stage.

Manson[47] (1825) in his book, "Medical Researches on the Effects of Iodine in Bronchocele, Paralysis, Chorea, Scrofula, Fistula Lachrymalis, Deafness, Dysphagia, White Swelling and Distortions of the Spine," devotes 102 pages to the use of iodine in the treatment of paralysis. He gives many case histories that appear to be identical with the disease known today as poliomyelitis.

Good[48] (1826), in his "Treatise of Nervous Diseases", classifies nervous diseases into classes, orders, genus and species. Under the heading "Carus" he lists asphyxia, ectacy, catalepsy, lethargy, apoplexy and paralysis. He speaks of that form of apoplexy from intestinal worms, or some other acrimony of the stomach, or from teething, and which consequently, occurs at an early instead of a late period of life, and has been especially denominated apoplexia infantum. With regard to palsy, this author states: "Other causes are exposure to the rays of the sun, drinking cold water and bathing in it when heated, repelled eruptions, and chronic rheumatism."

Good apparently suspected constitutional factors when he stated: "Now all the accidental or effective causes of apoplexy are well-known to be the causes, also, of the other nervous affections we have referred to, but if this be the case, how comes it that they thus vary in their result, and that one person, and at one period of life, produces lethargy, palsy, convulsions, or epilepsy, or that some of them should exist without producing any of these diseases or any other disease whatever, is it not, perhaps possible for us to develop the precise condition of the sensorium that leads to any one of these effects, rather than any other; but that there is such a condition forming a predisponent or remote cause of the specific disease that shows itself, must, I think, be allowed by every one who seriously considers the subject."

One is impressed by the numerous reports of club feet in the literature early in the 18th Century. These were reported chiefly from Germany, France, England and the United States. Paul[49] (1936) noted that operations for clubfoot became popular in the United States prior to 1841. Sinkler[49] (1885) stated that most cases of clubfoot are the result of infantile paralysis.

Copland[50] (1850), England, in his book indicates that apoplexy and paralysis are closely related. This would appear to indicate

that the disease we now know as poliomyelitis was still, in 1850, more or less included throughout the British Isles in a heterogenous group of diseases. He states: "Palsy and apoplexy are intimately connected with the other in their causes, seats, pathological conditions, and treatment, as to render it most difficult, if not altogether impossible, to treat fully and satisfactorily one apart from the other." He further says: "Palsy of a single limb is not infrequent in children. It has been imputed to a loaded state of the bowels or to a disorder of the stomach; but disease of the brain or spinal cord is probably more immediately those connected with its occurrence. Some of these cases grow up and present the limb of a child joined to the body of an adult. Paralysis, sometimes partial, at other times more or less general, accompanies the advanced progress of the disease usually called acute hydrocephalus, and of true or chronic dropsy of the brain. But palsy is sometimes met with under different circumstances, especially during suckling and teething; and although not so frequently as immediately after birth, still sufficiently often to have procured for it, as occurring at this period, more attention than has been paid to it. Paralysis of one limb, most frequently of a lower limb, sometimes occurs during the first dentition; but the palsy is generally incomplete, and is limited to the function of motion. If the insensibility be also paralysed, which is very rarely the case, the limb ceases to grow so fast as the other, and its temperature is diminished."

The first reference to an epidemic of paralysis in infants in the United States is that of Colmer[51] (1843). While on a visit to West Feliciana, Louisiana, in the fall of 1841, his attention was called to a year-old child slowly recovering from an attack of hemiplegia. He learned that eight or more cases of hemiplegia or paraplegia, had occurred within the preceding 3 or 4 months in children under 2 years of age. The cause seemed to be the same in all, namely, teething.

Poliomyelitis apparently existed in other parts of the United States before Colmer's report since frequent reports of clubfoot operations appear in the early literature. A report by Black[52] (1861) of six cases of infantile paralysis in Cambridge, Ohio, in the summer and fall of 1859, indicates its existence at that time. Taylor[53] (1859), Boston, was apparently familiar with the disease since he reported the treatment of "paralysis of motion".

During the Civil War, statistics from the Union Army reveal that poliomyelitis doubtless existed in epidemic proportions during the war years. Woodward[54] points out that 2,907 soldiers were discharged from the service during the war on account of paralysis, and 272 deaths were attributed to the same cause.

Smart[55] states: "Among the cases of disease due apparently to exposure to cold and wet were many in which the spinal cord and its membranes became affected," Surgeon J. E. Sanborn[56], 27th Iowa, writing from Jackson, Tennessee, March 31, 1863, also refers to this spinal affection as follows: "A singular affection has manifested itself in this regiment, taking a form of a severe spinal irritation and, possibly spinal meningitis. There is pain in the lumbar region, occasionally sharp but usually dull and aching; at times the feeling is described as a sense of numbness, with inability to stand or sit straight and a difficulty in lying down except in certain positions. There is tenderness on pressure upon the spinal processes or just upon either side of them. The first cases of this disorder I suspected to be feigned, but the prevalence of the affection and the character of many of the subjects soon indicated that in many cases it was a reality. Some cases were at first thought to be the result of an affection of the kidneys brought on by lying on wet ground, an idea suggested by the fact that they were accompanied by dark or very red urine.* In other cases it was observed that this affection either followed or accompanied chronic diarrhea. A number, having limped about with canes to support their bending spines for some time, have finally been discharged."

Smart[55] states: "Sometimes the attack was so sudden that the case was reported as one of paralysis, or as inflammation of the spinal cord and its membranes, if associated at its inception with febrile movement and tenderness over some part of the spine. The disease was reported as chronic myelitis when the spinal tenderness was not associated with a symptomatic pyrexia. Whether the inflammatory action in these cases was modified by a rheumatic diathesis is uncertain; but in its lighter grade, when characterized merely by pain and stiffness, or impairment of muscular power in

*This observation suggests the presence of porphyrinuria which has been recently reported by Watson et al.[57] in cases of poliomyelitis. Some contemporary writers during the Civil War era employed the term "reflex paralysis" to cases characterized by this peculiar appearance of the urine.

the limbs, it was generally reported as chronic rheumatism." He states that injuries may have determined the localization of the inflammatory results of exposure. He says: "Overexertion and heavy burdens on the loins would predispose by repetition as surely as a more pronounced injury inflicted but once. Some, reported originally as chronic rheumatism, were discharged on account of the spinal affection manifested by paralysis and muscular tremors, and paralytic sequelae of such diseases as the continued fevers also contributed to the total of those discharged. Perfect recovery, implying ability to perform military service, was unusual in these cases of spinal affection."

Mott[58], also made observations regarding these paralytic cases. He reported, "A disease much noticed at the present time by that part of the profession connected with the army has been variously named neuralgia, myalgia, or from its chief location, intercostal neuralgia." Hyperesthesia was a striking feature. "Its prominent characters," he says, "are the following: Coming on gradually, showing itself first in a portion of the spine, gradually extending around the chest and down the extremities, though in some cases fixed in a particular situation, as in the lower bowels." He observed that the bodies of these patients were bent at an angle, and every effort to assume an upright position was attended with so much pain and distress that the patient would not make the attempt. At his hospital there were no fatal cases. He attributed the disease to malarial emanations from southern swamps, although many writers regarded the cause of these paralytic cases as malarial emanations or malarial poison* arising from swamps and conveyed through the air. Smart pointed out that the agency of water-supply had an important bearing in the transmission of the malarial poison. Analyses of the drinking water showed a high content of organic ammonia.

S. Weir Mitchell[60] (1866) in his article, "Paralysis from Peripheral Irritation with Reports of Cases", points out that the writings of many of the older physicians, as well as those of a later day, contain numerous cases of palsy, local and general. "To such cases," he says, "various names have been affixed, with the

*The term "malarial poison" and its synonyms, miasmic poison, swamp fever, etc. was apparently applied to a number of diseases before the discovery of the malarial parasite by Lavaran in 1882. Jones[39] (1867), for example, states, "It ought to be remembered that the malarious disorder is very multiform and that, especially in London, for one case of ague we have fifty of variously modified disorder."

intention of grouping a set of unexplained facts, or of indicating by the nomenclature the writer's view of the mode in which the malady was produced. It thus happens that the cases referred to have been classified under such terms as idiopathic paralysis, essential paralysis, functional paralysis, inhibitory palsy, paralysis by exhaustion, reflex paralysis. The industry of modern clinical observers has increased the number of these cases, and it has gradually become apparent that they differ very widely as to their original causation, and perhaps also as to the condition of the neural organs which corresponds to the various groups. Of late, however, the temptings of an ingenious theory, set forth by a neurologist of great ability, has led many physicians to follow him in view of these cases which unites them all in a single class, whose nomenclature is meant to point out the pathological mechanism which gives rise to their occurrence."

Following the Civil War and until 1890, reports of poliomyelitis appeared under various names in the American literature. The disease of those days was designated by no less than 32 names (Table 3) and was reported from many parts of the United States.

TABLE 3. *Nomenclature of Poliomyelitis Following Civil War to* 1890.

Acute anterior myelitis	Myelitis of the anterior horn
Acute anterior poliomyelitis	Organic infantile paralysis
Acute ascending paralysis	Painful paralysis of early life
Acute poliomyelitis	Palsy of children
Acute spinal paralysis	Paralysis of exhaustion
Anterior poliomyelitis	Paralysis in children
Anterospinal paralysis	Paralysis in infants
Chronic anterior poliomyelitis	Poliomyelitis
Chronic atrophic spinal paralysis in in children	Poliomyelitis anterior acute infantilis
Essential paralysis	Poliomyelitis anterior acute infantium
Functional paralysis	Reflex paralysis
Idiopathic paralysis	Spastic infantile paralysis
Infantile paralysis	Spinal paralysis
Infantile spinal paralysis	Spinal paralysis of infants
Muscular paralysis	Subacute spinal paralysis
Myelitis	

That poliomyelitis, as we know it today, was still included more or less in a heterogenous group of diseases in the British Isles during the last half of the 19th Century is indicated by Roberts[61] (1884). Although he describes infantile paralysis and spinal paralysis of adults in his book, he also points out that motor

paralysis may result from various reflex disorders and is also associated with pregnancy, dentition, worms, or exposure to cold or wet.

HEAT-APOPLEXY

It has not infrequently happened in the history of medicine that the incidence of one disease will decrease for no apparent reason whereas the incidence of another disease will increase. This fact appears to be prominently shown by the decreasing incidence of illnesses formerly attributed to the effects of sunlight and heat and the increase in the incidence of poliomyelitis.

In the early literature one finds reference to epidemics of heat-apoplexy, solar asphyxia, heat asphyxia, heat dyspnea, etc. These terms, and others employed in the early literature, were more inclusive than the present classification of the effects of heat. The epidemiology, symptoms and pathology of these earlier classifications correspond with those of epidemic poliomyelitis. The literature on this subject is too vast to review extensively in this report.

T. Barlow[62] (1879), England, appears to note a correlation of heat-stroke and poliomyelitis in the following report. In abstracting an article by W. H. Barlow entitled, "On Regressive Paralysis (Infantile Paralysis; Spinal Paralysis of Adults)", he states: "This is the first paper, as far as I know, in which attention is drawn to the frequency of the onset of this disease in the two hottest months of the year. Of fifty-three cases in which the date of the attack could be fixed with accuracy, twenty-seven occurred in the months of July and August. Judging from the facts by the author, it would appear desirable in the future to inquire more closely into the possibility of heat-stroke as well as local cold exposure."

Sambon[63] (1898), England, felt that heat is by no means the primary cause of sunstroke; he believed it to be a specific infectious disease. He considered the original disease to have been latent, and the sudden prostration, under the influence of fatigue, excitement, alcohol, or heat might be its first manifestation. He makes the following pertinent remark: "Even the oldest Anglo-Indian surgeons while admitting heat to be the cause of the disease thought there must be something else, and frequently in their writings mention as a cause, 'sun or heat and something more.'"

This additional factor was considered by some Anglo-Indian and other contemporary and later writers to be a poison.

Sambon, in support of his infectious theory, points out that in one locality sunstroke may be extremely prevalent, in another totally absent, though the region may be quite adjacent and under precisely similar climatic influences. He observes that its ravages in the same locality, but in different years, vary immensely, and quite irrespective of heat. He states: "The symptoms of the disease, its relapses, its morbid anatomy, its peculiar geographical distribution, the conditions of climate and soil under which it prevails, the relative immunity to its attacks afforded by acclimation all clearly point to the specific infectious nature of the disease." Sambon noted that sunstroke is more common in males than in females and is often mistaken in children for cholera infantum or enteritis; also for miliaria and cerebrospinal fever.

Rinehardt[61] (1944) makes some significant remarks concerning sunstroke and poliomyelitis. He says: "It is interesting to recall the symptomatology of heat prostration as recorded by Lambert during the unusual heat wave that occurred in New York City, in 1896. The prodromal symptoms of heat prostration usually were severe headache, dizziness and pain in the back and tingling of the hands and feet. These symptoms are remarkably reminiscent of the prodromes or early manifestations of poliomyelitis. In this connection it is interesting to note that heat stroke and heat prostration entered into the differential diagnostic considerations during the dual epidemic of poliomyelitis and encephalitis which occurred in Manitoba in the summer of 1941."

Bowerman[65] (1948), Actuarian of the New York Life Insurance Company, has furnished the present writer with a tabulation of deaths in the United States from 1904 to 1945, caused by acute anterior poliomyelitis and sunstroke. These figures appear to indicate that one of the reasons for the apparent increase in the number of cases of poliomyelitis reported during recent years is that cases formerly designated as heat-apoplexy are apparently now designated as poliomyelitis. Further, these figures seem to indicate the reason why the incidence of poliomyelitis has been noted to involve older age groups, as observed by a number of writers, during recent years.

Bowerman writes: "In 1911, there was a large number of

deaths from excessive heat and a relatively slight decrease in the number of deaths from polio. However, the decrease is about 400 deaths as against an increase of more than 2300 from heat. Deaths from each cause went up in 1916 and 1921. In 1927, there was a big increase in the number of polio deaths and a very slight decrease in deaths from heat. In 1931, both increased markedly. In 1934, a large number of deaths from heat occurred followed by a moderate increase in polio deaths in the following year, and then in 1936, a large number of deaths from heat was followed by a substantial increase in polio deaths in 1937. In these four years, therefore, there was an alteration which had not been evident before. After 1936, there has been a tendency for the deaths from heat to decrease until in 1945, the number of deaths from this cause was only about the same as in 1904 when the population was very much smaller."

SUMMARY

1. Although it has often been stated that poliomyelitis appeared in epidemics only 50 or 60 years ago, there is evidence that the disease has existed for centuries. Prior to 1890—59 years ago—poliomyelitis was reported from at least 24 different countries by more than 100 different names.

2. There is evidence that poliomyelitis was known to the ancient Egyptians; it was apparently described by the early Greek writers under the name of apoplexy. This term, or various modifications of it, was applied until the 19th Century to paralytic manifestations occurring during seasons when epidemics of poliomyelitis are known to occur.

3. The term heat-apoplexy, which often resulted in manifestations similar to those of encephalitis and poliomyelitis, was also formerly applied to epidemics of disease appearing during hot seasons.

4. The incidence of sunstroke has decreased during recent years, whereas the incidence of cases of poliomyelitis has increased and has involved older age groups. This paradoxical situation suggests that cases formerly designated as heat-apoplexy, sunstroke, etc., are now classified as poliomyelitis.

5. The criteria for the diagnosis of poliomyelitis, viz, the presence of an epidemic, fever, rigidity of the spine, pleocytosis, and

paralysis were not infrequently present in the cases of heat-apoplexy described by early writers.

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REFERENCES

1. Snyder, J. K.: Pellagra. Abt's Pediatrics. Vol. 2, 1923.
2. Editorial: Edinburgh M. & S. J., 4: 464-469, Oct. 1808.
3. Cooke, John: Treatise on Nervous Diseases, 1824.
4. Prosper Alpino: Quoted by John Cooke, Ref. 3.
5. Mitchell, J. K.: Tr. A. Am. Physicians, 15: 134, 1900.
6. Hansen, E.: Hosp. Bull. Univ. Maryland, 8: 192, 1912-13.
7. Hamburger, O.: Ugesk. f. laeger, 73: 1565, 1911.
8. Hippocrates: Quoted by J. M. Good, Ref. 16.
9. Abercrombie, J.: Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord, 1828.
10. Areteus: Quoted by John Cooke, Ref. 3; and J. M. Good, Ref. 16.
11. Alexander of Tralles: Quoted by John Cooke, Ref. 3.
12. Aetius: Quoted by John Cooke, Ref. 3.
13. Paulus Aegineta: Quoted by J. M. Good, Ref. 16; and John Cooke, Ref. 3.
14. Galen: Quoted by John Cooke, Ref. 3.
15. Celsus: Quoted by J. M. Good, Ref. 16; and John Cooke, Ref. 3.
16. Good, J. M.: The Study of Medicine, 4th Am. Ed., Vol. IV, 1828.
17. Serres: Quoted by John Cooke, Ref. 3; and J. M. Good, Ref. 16.
18. Foresti, Domini Petri: Observationum et Curationum medicinalium ac chirurgicarium pera omnia, Francofurti, 1634.
19. Baglivi, Geo.: The Practise of physic reduced to the ancient way of observations, containing a just parallel between the wisdom and experience of the ancients and the hypothesis of modern physicians, etc. Printed for Andr. Bell et al, London, 1704.
20. Lancisi, Jo. M.: Opera omnia in unum congesta, Venetiis. 1739.
21. Morgagni: Quoted by James Copland, Ref. 50.
22. Formey: Quoted by James Copland, Ref. 50.
23. Stoll: Quoted by J. Abercrombie, Ref. 9; and John Cooke, Ref. 3.
24. Frank: Quoted by J. Abercrombie, Ref. 9; and James Copland, Ref. 50.
25. Cheyne: Quoted by John Cooke, Ref. 3.
26. Hunter, John: Quoted by J. M. Good, Ref. 16.
27. Garrison, F. H.: J.A.M.A., 73: 709, Aug. 30, 1919.
28. Greig, D. M.: Edinburgh M. J., 39: 497, Aug. 1932.
29. True, K. M.: Nation, 103: 442, Nov. 9, 1916.
30. Uwins, D.: Edinburgh M. & S. J., 8: 405-411, Oct. 1812.
31. Sym, J.: Edinburgh M. & S. J., 14: 316-324, July 1818.
32. Editorial: Edinburgh M. & S. J., 14: 528-549, Oct. 1818.
33. Edmonston, H.: Edinburgh M. & S. J., 14: 71-84, Jan. 1818.
34. Abercrombie, J.: Edinburgh M. & S. J., 14: 42-68, Jan. 1818.
35. Abercrombie, J.: Edinburgh M. & S. J., 14: 265-328, July 1818.
36. Abercrombie, J.: Edinburgh M. & S. J., 14: 552-592, Nov. 1818.
37. Abercrombie, J.: Edinburgh M. & S. J., 15: 1-13, Jan. 1819.
38. Abercrombie, J.: Edinburgh M. & S. J., 15: 481-512, Oct. 1819.
39. Gourlay, W.: Edinburgh M. & S. J., 15: 329-344, July 1819.
40. Hunter, A.: Edinburgh M. & S. J., 15: 234-252, April 1819.
41. Shaw, J.: On the nature and treatment of the distortions to which the spine and the bones of the chest are subject with the inquiry in the merits of the several methods of practice which have hitherto been followed in the treatment of distortions, London, 1823.
42. Boerhave, Hermann: Praelectiones de morbis nervorum, Leyden, 1761.
43. Goodeve, Birch, E. A.: Goodeve's hints for the management and medical treatment of children in India. 7th Ed., 1879.
44. J. H. W.: Edinburgh M. & S. J., 2: 52-55, Jan. 1808.
45. Fothergill: Quoted by John Cooke, Ref. 3.
46. White: Quoted by Cheyne, J., Edinburgh M. & S. J., 4: 341-347, July 1808.
47. Manson, Alexander: Medical Researches on the effects of Iodine in Bronchocele, Paralysis, Chorea, Fistula Lachrimalis, Deafness, Dysphagia, White Swelling, and distortions of the Spine, London, 1825.
48. Paul, J. R.: Yale J. Biol. & Med., 8: 643-648, July 1936.
49. Sinkler, W.: Med. & Surg. Reporter, 53: 594-596, Nov. 21, 1885.
50. Copland, James: On the causes, nature, and treatment of palsy and apoplexy. Of the forms, seats, compliment and morbid relations of paralytic and apoplectic diseasces, 1850.
51. Colmer, G.: Paralysis in Teething Children. Am. J. Med. Sc., 5: 248, Jan. 1843.
52. Black, J. R.: Cincin. Lancet & Obs., 4: 15, 1861.
53. Taylor, C. F.: Boston M. & S. J., 60: 329, 1859.

54. Woodward, J. J.: The Medical and Surgical History of the War of the Rebellion. Part 2. Vol. 1. Medical History Vol. U. S. Government Printing Office, Washington, D. C., 1879.
55. Smart, Major Charles: The Medical and Surgical History of the War of the Rebellion. Part 2. Vol. 1. Medical History Vol. Third Medical Volume. U. S. Government Printing Office, Washington, D. C., 1868.
56. Sanborn, J. E.: Quoted by Major Charles Smart, Ref. 55.
57. Watson, C. J.: Schulze, W.: Hawkinson, J. and Baker, A. B.: Proc. Soc. Exp. Biol. & Med., 64: 73-78, Jan. 1947.
58. Mott, A. B.: Quoted by Major Charles Smart, Ref. 55.
59. Jones, C. H.: Clincial Observations of Functional Nervous Disorders, Phila., 1867.
60. Mitchell, S. Weir: New York M. J., 2: 321-355, Feb 1866.
61. Roberts, F. T.: The Theory and Practice of Medicine. 5th Am. Ed., 1884.
62. Barlow, T.: Brain, 2: 73-75, April 1879.
63. Sambon, L. W.: Brit. M. J., 1: 744-748, March 19, 1898.
64. Rinehardt, J. F.: J. Nerv. & Ment. Dis., 99: 825-833, 1944.
65. Bowerman, W. J.: Personal Communication.

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EXCHANGE TRANSFUSIONS IN NEWBORN BABIES. (Revue d'Hématologie, Paris, 4: 36, 1949). Van Loghem and Bartels treated 160 newborn babies with hemolytic anemia with repeated and massive replacement transfusions, using Diamond's technic but employing a rubber catheter instead of the plastic catheter. Heparinized blood was used in the majority of the cases. The catheter and the syringes must be washed regularly during treatment with a weak heparin solution to prevent the formation of clots. Thirty-six of the infants died, a mortality rate of 22.5 per cent. Seven of the deaths were not related directly to the hemolytic anemia. When these latter cases are eliminated, the mortality rate is 18.1 per cent. In the remaining 29 instances death resulted from kernicterus in 9, fetal dropsy in 3, incompatible blood in 3, hemorrhages in the visceral organs in 5, premature birth in 1 and belated treatment in 1; in 7 cases the cause of death was unknown. The mortality rate in the group of treated infants was compared with that of a group of infants with erythroblastosis fetalis in the same families who were not treated by exchange transfusions. The mortality rate in the later group was 73.3 per cent for the infants with severe icterus and 63.5 per cent if those with mild icterus were included. The mortality rate was reduced from 63.5 per cent to 18.1 per cent by the application of exchange transfusions. It is the only treatment which has thus far proved effective.—*Journal A.M.A.*

BOOK REVIEWS

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON CHILD PSYCHIATRY. Vol. II. Edited by J. C. Flugel, D. Sc. Paper. Pp. 142. Price $2.50. New York: Columbia University Press, 1949.

This volume is the second of four which record the proceedings of the International Congress on Mental Health which conference was held in London in August 1948. This second volume is devoted to the conference on Child Psychiatry and specifically discusses the subject of aggression. The subject matter is written in both English and French, although the greater part of the book is in English. Four main topics were discussed at the Conference, viz., (1) Aggression in Relation to Emotional Development, Normal and Pathological. (2) Aggression in Relation to Family Life. (3) Psychiatric Problems in the Educational Sphere and (4) The Community and the Aggressive Child. These discussions are very valuable and should be widely read, especially by those who are interested in children and their behavior problems. The opening address by F. H. Allen, who is director of the Philadelphia Child Guidance Clinic on Aggression in Relation to Normal Development, was of especial interest. As one of the discussors of Aggression in Relation to Family Life, Maccalman asks a most pertinent question: "Are we in a period of transition from direct to indirect methods of influence when the family unit is surrendering its function to the wider unit of the State, which has not yet learned to exercise them adequately?". This small volume is highly recommended for thoughtful consideration.

MICHAEL A. BRESCIA, M.D.

MALE AND FEMALE. By Margaret Mead. Cloth. Pp. 477. Price $5.00. New York: William Morrow & Co., 1949.

The author has given us a study of the role and functions of the sexes as they are modified by cultures of various societies. She has used the anthropological study of primitive cultures as her laboratory and applied this information to the interpretation of the so-called more advanced societies. The substance of this book was given as The Jacob Gimbel Lectures in sex psychology under the auspices of Stanford University and the University of California

in November 1946. Although one may not agree entirely with the author's conclusions and recommendations, this volume is nonetheless interesting and worthy of reading by the thoughtful physician. The present day concept of alleviating the problems of housing, food and population by increasing contraception makes one ponder the following: "Societies may be differently successful in teaching each sex its reproductive role, and when both sexes set their hearts against reproduction, then such societies die out—even without benefit of contraceptives". The role of breast feeding, aside from the nutritive considerations, has of late been endowed with psychiatric implications. And among other things the author has to say anent breast feeding is the following: "At what age the child distinguishes the exact difference between a glass bottle and a rubber nipple, loose in space, and a human breast we do not know, but the mother experiences the difference from the start, and her experience is available to the child, in her voice, in her hands, in the very tempo of her being. She is not giving the child herself; she is faithfully, efficiently providing the child with a bottle, external to both of them, substituting for a direct relationship a relationship mediated by an object".

MICHAEL A. BRESCIA, M.D.

MEMORIES OF EIGHTY YEARS. By James B. Herrick, M.D. Cloth. Pp. 270. Price $5.00. Chicago: The University of Chicago Press, 1949.

Dr. Herrick has been on the medical scene some sixty years and in the last of the Shakespearean Ages of Man writes his memoirs interspersed with a bit of philosophy. This volume is a charming history of medicine beginning with 1890 and ending with the present era. In this comparatively short span the changes in the education and practice of medicine seem at first hand incredible. It was not too long ago when appendectomy for acute appendicitis was an innovation, the use of antitoxin for diphtheria a novel and hazardous procedure and scores of other examples. The refinements in diagnosis and treatment, even in the last decade, have made great strides—imagine what the future has in store. Dr. Herrick did a great deal of traveling and came in contact with many well-known men in the field of medicine. His brief biographical references to many of the famous men of medicine are interesting

and to the point. Anyone who studied in a medical school in Chicago as the reviewer did would be especially interested in Dr. Herrick's biography since many of the names and places would be quite familiar and naturally arouse a certain amount of nostalgia.

MICHAEL A. BRESCIA, M.D.

NURSERY SCHOOL GUIDE. THEORY AND PRACTICE FOR TEACHERS AND PARENTS. By Rhoda Kellogg. Cloth. Pp. 501. Price $4.00. New York: Houghton Miffln Company, 1949.

If a parent, or even a trained student, contemplates starting a nursery school, this book should prove valuable. It describes in unusual detail, though sometimes with emphatic didacticism, every consideration involved in such an enterprise. It discusses not only management and the physical plant, but educational, psychological, medical and dietary problems. The pediatrist, whose patients attend nursery school, or who participates in the nursery school program, will be helped by it to appreciate the medical role in relation to the total program even though he may not be in strict accord with the specific hygiene rules prescribed. Unless the pediatrist is willing to study the nursery school problem as a whole he may find his recommendations inappropriate and thus rejected. By understanding all the issues involved he can best serve parent and child, bringing the best of medical knowledge to their attention and, thereby, safeguard the child's physical health.

HELEN THOMPSON, PH.D.

VISION, ITS DEVELOPMENT IN INFANT AND CHILD. By Arnold Gesell, M.D., Frances L. Ilg, M. D. and Glenna E. Bullis. Cloth. Pp. 329. Price $6.50. New York: Paul B. Hoeber, Inc., 1949.

Dr. Gesell has been noted for his detail pioneering studies and this is another one dealing with vision in infancy and early childhood. Because the infant and preschooler is not able to cooperate by conforming to directions and responding to questioning, the problem of vision in early childhood has been relatively neglected. By using appropriate situations, accompanied by astutic observations, Gesell, Ilg and Bullis have been able to chart the development of vision in the young child. Vision is a wholistic response, i.e., a child does not see things and react to them regardless of other stimuli but rather he responds to them as part of his total environ-

ment and if, at the moment, his hunger pangs are strong, or if a competing visual stimulus predominates, they are given preference. By controlling competing stimuli, the authors are able to determine, more accurately, the child's visual response to specific stimuli and thereby secure refractive measures, otherwise unobtainable. The main part of the text is appropriately devoted to a discussion of previously published material relating to visual responses. The remaining sections describe, in detail, the techniques of examining a young child's visual responses. The normal growth changes from age to age are described. Finally, the development of a non-seeing child, otherwise normal, is studied. The life of Helen Kellar has shown us how an individual can surmount deprivation of both hearing and sight. The non-seeing child described in this publication gives specific evidence of the essential role played by vision and how the individual functions without it. While final evaluation must await ophthalmologic appraisal, it can be said with confidence that Gesell and his associates have contributed greatly to our knowledge of the role of vision in infancy and early childhood. Pediatricians will certainly want to study the evidence for themselves.

HELEN THOMPSON, PH.D.

GLUTAMIC ACID IN MENTALLY RETARDED CHILDREN. (Nederlandch Tijdschrift v. Geneeskunde, Amsterdam, 93: 1044, April 2, 1949.) Ernsting administered glutamic acid to 8 mentally retarded chilren and treated 4 controls with an indifferent substance. No mental progress could be observed in those treated with glutamic acid; they did not advance more than did the control group. Some seemed to be less dull and inattentive, and emotional instability was lessened, but there was no corresponding improvement in the intelligence quotient. The same changes were observed in the controls. The author stresses that in evaluating the results of such tests, the mental and physical condition of the child should be taken into account, also the learning of the test and the influence exerted by close attention to the child.—*Journal A.M.A.*

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